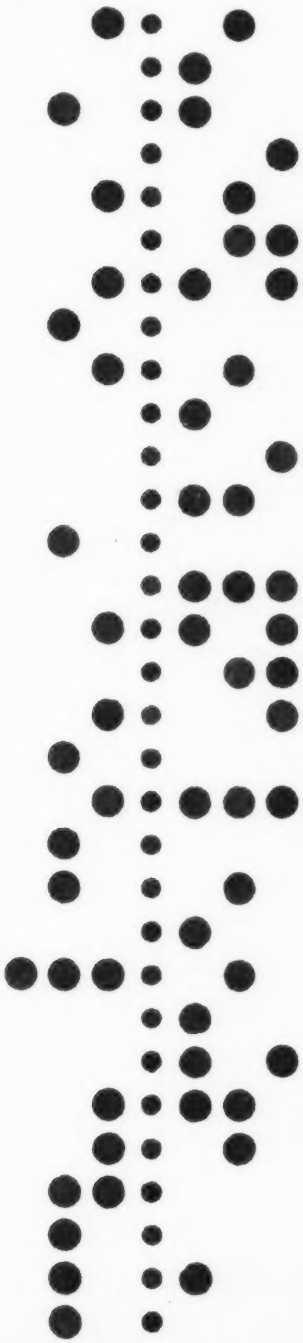
August 20, 1965

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



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CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION

U. S. DEPARTMENT OF COMMERCE / NATIONAL BUREAU OF STANDARDS / INSTITUTE FOR APPLIED TECHNOLOGY

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RESEARCH AND DEVELOPMENT REPORTS

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PURPOSE

U.S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is published by the Clearinghouse for Federal Scientific and Technical Information to announce the availability of new reports of U.S. Government-sponsored R&D released by the Department of Defense and other Federal agencies. Included are reports from the Atomic Energy Commission and the National Aeronautics and Space Administration, which issue separate announcement journals as noted below.

FORMAT

USGRDR contains two sections with a combined table of contents. The first section, "Technical Abstract Bulletin" (TAB), announces reports released by the Defense Documentation Center (DDC) of the Department of Defense. The second section, "Other Research Reports and Related Material," announces reports released by civilian agencies and also includes certain older military reports. Reports are listed by accession/report number under 22 major subject category headings. Both sections contain abstracts and complete bibliographic citations and are followed by their respective indexes. Reports of current high industrial interest are featured in "Research Highlights."

HOW TO USE

Readers are urged to review all abstracts in their fields of interest, noting accession/report numbers and titles of reports to be ordered. Although primarily for retrieval, the descriptors provide a quick grasp of a report's scope. The reader is reminded that reports applicable to his field may be found under various subject category headings; the various indexes will aid in locating those reports. A single reference guide to new Government-sponsored technical literature, *Government-Wide Index to Federal Research and Development Reports*, is compiled monthly by the Clearinghouse from the combined indexes of this journal, *Nuclear Science Abstracts* (AEC), *Scientific and Technical Aerospace Reports* (NASA), and *Technical Abstract Bulletin* (DDC). This combined index is available from Superintendent of Documents, U.S. Government Printing Office, annual subscription $10, ($2.50 for foreign mailing) or $1.25 single copy.

TO ORDER REPORTS

All reports announced herein are available to the general public from the Clearinghouse, or in some cases from other sources as noted. To order Clearinghouse reports, use accession/report number (as given on the first line of each entry) and title from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche copy (MF) are given for each entry. Prepayment is required unless purchases are to be charged to Clearinghouse deposit accounts. Order forms will be found in the back. Make check or money order payable to National Bureau of Standards—CFSTI.

OTHER JOURNALS

Reports of the National Aeronautics and Space Administration and the Atomic Energy Commission can be ordered from the Clearinghouse. They are abstracted in the following journals available from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NUCLEAR SCIENCE ABSTRACTS, Atomic Energy Commission, $30 a year domestic, $37 foreign, $1.75 single copy plus 25 percent foreign mailing.

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS. National Aeronautics and Space Administration, $33.00 a year domestic, $42.00 foreign, $2.50 single copy plus 25 cents foreign mailing.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated.
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RESEARCH highlights

Reports of current high industrial interest

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Metalworking and Metal Forming

NUMERICALLY CONTROLLED PROFILING MACHINES

(Order AD-617 760 Profile Milling Requirements for the Hard Metals 1965-70, HC $2.00/MF 50 cents.)

Profile milling requirements for the hard metals for the 1965-70 period must make full use of numerically controlled profiling machines. The machines must possess characteristics beyond those heretofore available in any significant quantity to do exacting work in the aerospace industry. A report of the Ad Hoc Machine Tool Advisory Committee to the Air Force says that the growing dependence of the aerospace industry upon the new high-strength, high-temperature resistant steels, titanium, refractory metal alloys and superalloys is imposing new and difficult manufacturing problems upon Government contractors and subcontractors. Even parts processed from the soft metals are being designed today to closer tolerances to meet the requirements of advanced technology. These parts are getting larger and more troublesome to machine; they can be produced only at excessive cost and with much inefficiency on old, outmoded equipment. "The deficiencies of the profiling machines now in use in the aerospace industry," says the report, "show up in a nation-wide inventory taken by this Committee. Almost all of the numerically controlled profiling machines now in operation were designed in the early 1950's to machine the soft metals. As for the tracer-controlled profilers, they are fore-runners in

AD-617 760 continued

design of numerically controlled machines; they do the work more slowly and, most critical, are incapable of performing to the very fine tolerances required as aerospace manufacturing specifications become more and more exacting." Despite their deficiencies, tracer controlled profiling machines will continue to be a vital part of the production program, but in time they will suffer more and more by comparison with numerically controlled profiling machines as the hard metal machining job grows in size and complexity. "It is a reasonable expectation in the Committee's opinion," the report continues, "that over the next 10 years the use of tracer controlled machines will be phased down in favor of numerically controlled machines." After analyzing more than 150 aerospace programs, the Committee recommended these actions: 1) that an immediate start be made on a program of buying 551 numerically controlled profile milling machines; 2) that the buying program should be a concerted effort by the Department of Defense, prime contractors and subcontractors, with all participants investing their own funds; 3) that DOD should participate by continuing its long-standing policy of budgeting funds each year for the modernization of its machine tool inventory; and 4) that the Government should minimize the risk taken by contractors in buying machines for programs subject to change or cancellation by providing indemnification if and when contractors suffer losses because machines are idled through no fault of their own. (This document cited in this issue on page 103.)

HARD-TO-MACHINE MATERIALS GROWTH

(Order AD-617 759 Trends in Hard Materials: Report of Task Force No. 3 of the Ad Hoc Machine Tool Advisory Committee to the Department of the Air Force, HC $2.00/MF 50 cents.)

Hard-to-machine materials will make up 70 percent of the steels, refractory metals, filament technology materials, and composite laminates used in the next 8 to 10 years by the U. S. aerospace program. This is the finding of the Air Force Machine Tools Ad Hoc Committee which recently completed a survey of aerospace industry producers, specialty materials producers, and special study groups such as the Battelle Memorial Institute. The Air Force organized the Committee to measure existing capacity and to forecast future requirements since they expect that the new difficult-to-machine materials will become an important factor on metal removal rates. Design, structures, materials and manufacturing specialists of aerospace industry and specialty materials producers furnished the Committee with consolidated opinions of the materials with which they expect to be working within 5 to 10 years. The Committee suggested these categories: steels to 400 ksi, titanium alloys to 250 ksi, refractory materials to 160 ksi, filament technology materials to 1000 ksi, and composite laminates to 400 ksi. (This document cited in this issue on page 88.)

Transportation

The following studies on future highway, rail and air transportation were made by consulting engineers for the U. S. Department of Commerce and its Washington-New York-Boston Corridor Research Project as part of the overall investigation of transportation needs between now and 1980. The reports are, for the most part, of a preliminary nature. They were designed to establish the feasibility of the research effort and to provide guidance for future research and development and transportation policy and planning.

FUTURE HIGHWAY TECHNOLOGY

(Order PB-166 878 A Projection of Technology Applicable to the Future Highway System of the Boston-Washington Corridor, HC $7.00/MF $2.00.)

This study found that the basic design of automobiles is expected to remain essentially unchanged over the next 15 years, and that technical innovations will be primarily in communications devices for traffic control and control devices to help the driver. It foresees the possibility of "Century Expressways" over which autos will cruise at 100 mph. Trucks, on the other hand, are expected to undergo significant modifications as the art of containerization progresses. Truck trains with increased power, size and weight are predicted.

FUTURE HIGHWAY TRAVEL

(Order PB-166 881 Highway Travel in Washington-New York-Boston -- Megalopolis, HC $5.00/MF $1.00.)

Vehicle travel on highways linking 26 major cities in the Northeast Corridor will more than double in the 20-year period ending in 1980. The study showed approximately 327,000 such trips a day during 1960 and forecast 716,000 by 1980. Intercity truck traffic is expected to increase from 27,000 a day to 59,000. The Interstate Highway System, geared for 1972 traffic volume, is expected to provide adequate facilities through 1980 if properly supplemented.

IMPROVED RAILROAD SERVICE

(Order PB-166 886 Washington-Boston Transportation Study: Feasibility and Cost of Improved Railroad Service, HC $6.00/MF $1.25.)

Improved railroad service can be a major factor in helping to meet the intercity passenger travel demand in the Washington-Boston Corridor through the year 1980. Rails can haul heavy loads at low cost and high speed. Electronic control systems can increase capabilities and enhance safety. The study sees piggy-backing of automobiles on trains as one of a number of possibilities. It predicts total U. S. intercity passenger miles will increase from 899 billions in 1965 to as high as 1,444 billion miles in 1980.

AIRPORT NEEDS

(Order PB-166 883 Feasibility and Cost of Expanded Intercity Air Service in the Washington-Boston Corridor, HC $5.00/MF $1.25.)

Runway capacity at airports in the areas of Boston, New York, Philadelphia and Washington will be insufficient to handle the volume of traffic expected by the year 1980. Eight or ten new runways, costing about $90 million each, may be needed, this survey shows. But it notes that even this will not provide the most effective long range solution to the problem. It suggests air bus service for short hauls. This involves a large aircraft which can operate economically over 150 to 1,000-mile flights carrying 200 to 300 passengers. Development of such a craft, with flying costs of 1-1/2 cents per seat mile, is feasible if daily hours of use are high enough. The craft would have to be capable of rapid landing, unloading and quick turn-around to reduce the ratio of ground time to air time.

SPEEDING UP RAIL TRAVEL

(Order PB-166 879 Preliminary Engineering Report on Possible Improvements to Railroad Passenger Service Between New York and Washington, HC $4.00/MF $1.00.)

Rail travel time between Washington and New York can be reduced to around 2-1/2 hours. (The best trains now take 3 hours and 35 minutes.) This study shows one train can operate every hour in each direction, and "there is no valid engineering reason why such high-speed service with this frequency of trains could not be established." The engineering and service improvements costs to achieve this on The Pennsylvania Railroad would cost an estimated $200 million, not including $375,000 for each new high-speed multiple-unit, self-propelled electric passenger car. A doubling of the 1963 number of passengers would meet operating costs, interest and amortization charges and leave some $9 million for administrative and other expenses.

TWO-HOUR NEW YORK-WASHINGTON RUN POSSIBLE

(Order PB-166 880 Supplemental Report on Improvements to Railroad Passenger Service Between New York and Washington, HC $4.00/MF $1.00.)

With some track improvements along The Pennsylvania Railroad, electric passenger cars with top speed of 150 mph can make the run between New York, Philadelphia and Washington in two hours. This speed equals that of Japan's New Tokaido Line. There already are tracks to provide a two-hour run if a new tunnel were built through Baltimore and bridges at the Hackensack, Susquehanna and Bush Rivers were improved sufficiently. This would require the expenditure of an additional $764 million, according to this study which supplements a previous report aimed at a more modest 2-1/2 hour schedule between New York and Washington.

1980 FREIGHT DEMAND

(Order PB-166 885 Intercity Freight Transportation Requirements of the Washington-Boston Corridor in 1980, HC $6.00/MF $1.50.)

The total handle of freight in the Washington-Boston Corridor will nearly double by 1980. The total handle will reach 1.856 billion tons by then as compared to 1.036 billion tons handled in 1960. Incoming freight will increase some 75 percent, outgoing freight 86 percent. Trucks will nearly double their hauls. Domestic waterways are expected to show a 95 percent increase in outgoing shipments, 75 percent in incoming. Railroads should experience increases of 42 percent in outgoing freight and 37 percent in incoming, but their share of the overall market is expected to decline. Automobiles are expected to continue to make at least 60 percent of the intercity passenger trips in the corridor through 1980.

HIGH SPEED THROUGH NEW YORK CITY

(Order PB-166 887 Report on Research Area in Connection with High-Speed Service Between Washington, D. C., and Boston, Mass., HC $4.00/MF $1.00.)

To build a high speed rail passenger line through the New York Metropolitan Area capable of speeds over 100 mph would cost anywhere from $50 million to nearly a half a billion dollars, depending upon which of several proposed routes were used. This study is one of a series on high speed ground transport between Washington and Boston. It found running time could be reduced in this cost range: $51 million to shave off 14.5 minutes to $482 million to cut off 24-1/4 minutes.

RAILROAD SCIENCE AND TECHNOLOGY

(Order PB-166 882 Science and Technology in the Railroad Industry, HC $4.00/MF $1.00.)

This report found that current equipment research in the railroad industry is focused on current problems rather than long range problems of the future. It found, too, that "sweeping allegations that railroads have been resistant to change, that a great part of their current difficulties may be ascribed to a stubborn refusal to look for and apply technological improvements -- is not supported by the facts." It suggests that even if science and technology were exploited to the full, this alone would not solve all the industry's problems. It recommends more flexibility and specialization in meeting shipper requirements, more effort devoted to systems analysis and more technological advancements by railway component suppliers.

ESTIMATING VOLUME OF TRAVEL

(Order PB-166 884 Demand for Intercity Passenger Travel in the Washington-Boston Corridor, HC $6.00/MF $1.50.)

This report is described by its authors as "a pioneering effort." It attempts to estimate the volume of travel between specific population centers in the Washington-Boston Corridor through 1980. It establishes a comprehensive and flexible method for each mode -- auto, bus, rail and air. It covers both business and personal travel and gives weight to such factors as population, income, employment, location and travel time and cost. It undertakes to project the socio-economic environment in the Corridor through 1980 and to forecast demand for transportation services.

End of "Corridor Studies."

NEW OFFICE WILL COORDINATE FEDERAL WEATHER ACTIVITIES

(Order PB-167 629 The Federal Plan for Meteorological Services and Supporting Research, Fiscal Year 1966, HC 50 cents/MF 50 cents.)

Government departments and agencies that engage in weather activities are now joined in a plan to provide the Nation with more effective weather services. All Federal weather services and research and development programs to improve these services come under the plan except for military activities that involve special security considerations. The joint project, now in effect for Fiscal Year 1966, is called "The Federal Plan for Meteorological Services and Supporting Research." The newly established Office of the Federal Coordinator for Meteorological Services and Supporting Research has been created to coordinate the plan, thus filling a need expressed by Congress and the Executive Branch. The new Office is part of the Office of the Assistant Secretary of Commerce for Science and Technology. The Federal Coordinator will establish a single set of national goals for weather services so Federal agencies can have a framework within which they can plan for their own meteorological needs. This will achieve economy as the agencies work together toward a common goal. The Federal Government will get a higher return on its investment, better use of scientific manpower, and improved meteorological services. A report prepared by the U. S. Department of Commerce discusses the initial Federal plan and the many varied uses of weather information and the specific interests of the Government departments and agencies engaged in meteorological activities. For instance, these twelve departments and agencies now fund weather work: the Departments of Commerce; Air Force; Army; Navy; Treasury; Agriculture; Interior; Health, Education and Welfare; and the Federal Aviation Agency; National Aeronautics and Space Administration; Atomic Energy Commission; and the National Science Foundation.

R & D REVIEWS

Available FREE from the Clearinghouse

HONEYCOMB AND SANDWICH MATERIALS

(Order OTR-119 Honeycomb and Sandwich Materials, available free.)

Honeycomb and sandwich materials of wood, plastics, ceramics, and metals are finding increasing application in Government-sponsored projects. A few of the recent uses are wall paneling of wood sandwich materials in home building, ceramic dielectric sandwich components for radomes, cushioning plastic structures for air drop purposes, refractory metal constructions for hypersonic vehicles, and fiberglass and plastic combinations for beams and floor panels. Government projects out of which these uses arose as well as other projects of Federal agencies are described in a review prepared by the NBS Institute for Applied Technology. The review describes work on: (1) manufacturing methods and design; (2) testing of panels of various constructions for the effects of temperature, edgewise compression, thermal response, energy absorption, vibration, and strength as affected by surface waviness and core cell size; and (3) testing of joints (welding and brazing) made of various alloys. These projects have added considerable data to the existing knowledge on manufacturing methods, design, and the characteristics of materials being used in such panels. One important advantage such constructions have is their significant increase in strength while maintaining light weight.

MICROMINIATURE CIRCUIT PACKAGING TECHNIQUES

(Order OTR-120 Microminiature Circuit Packaging Techniques, available free.)

Significant contributions are being made by Government agencies to the growing body of research on microminiature circuit packaging techniques, according to a review prepared by the NBS Institute for Applied Technology. Probably the most significant advantage to evolve from the Government-sponsored efforts has been increased circuit reliability. Other advantages include decreased power consumption, improved environmental stability, a higher degree of system effectiveness, and reduced cost for many applications. Equipments using this technology also require fewer cabinets, drivers or shaping circuits, and coaxial or shielded wires, and less cabling. Although the Government work has been directed primarily toward military and space objectives, the advantages of the technology recommend its application to civilian devices. Three major categories of research and development are described in the review: conventional or discrete components, thin-film integrated circuits, and monolithic semiconductor integrated circuits. Reports of individual Government projects in these areas are discussed and are available from the Clearinghouse at the cost of reproduction.

FOAM TECHNOLOGY AND APPLICATION

(Order OTR-121 Foam Technology and Application, available free.)

A review on foam technology prepared by the NBS Institute for Applied Technology describes recent Government-sponsored work in materials and in applications. Significant results have evolved in each area as a result of the projects. Materials have been developed that provide good shock and vibration absorption for both high impact and ordinary packaging requirements. Similarly, materials have been found that provide enough structural integrity to be considered as a basic building material. The thermal insulation and buoyancy properties of foam products have also been found to have important applications. Foamed plastics are materials that have been expanded in volume, generally with a gas blowing agent, thereby acquiring a cellular structure. Other materials are foamed besides plastics, but the main Government research has been channeled toward applications of plastics. Classification of foams is based on structure, method of fabrication, degree of flexibility or rigidity, closed or open cellular construction, and whether they are foamed in place or prefoamed. Among the materials used to produce foams are cellular cellulose acetate, polyurethane, polystyrene, epoxy, phenolic, syntactic, ureaformaldehyde, silicone, vinyl, and polyethylene. Among the non-plastic foams are glass, foamed glass, silica, and metal filled. The review lists and discusses publications that point out properties, applications, sources of supply, and equipment needed. The reports are available at the cost of reproduction from the Clearinghouse.

DISPERSION-HARDENED METALS AND ALLOYS

(Order OTR-122 Dispersion-Hardened Metals and Alloys, available free.)

Recent Government-sponsored research has shown that dispersion hardening as a means of enhancing the strength properties of metals and alloys is a feasible technique. Since its introduction in the early 1950's, dispersion hardening has come under close scrutiny by Federal agencies, particularly as to the mechanism by which it operates. Aluminum, nickel, vanadium, and columbium have been used extensively as matrices for such dispersants as aluminum oxide, titanium carbide, zirconium carbide, thorium oxide, and magnesium oxide. The addition of these particles tends to reduce the deformation the matrix metal would undergo in a particular set of circumstances, usually high temperature and high stress. As an example of how strength increases through such additions, in one project the use of submicroscopic alumina particles in pure nickel increased yield strength from 10,000 to 40,000 psi. In another project, researchers through dispersions achieved a tensile strength of 127,500 psi in an aluminum alloy. Reports on these and other developments are listed and discussed in the review and are available at the cost of reproduction from the Clearinghouse.

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01 AERONAUTICS — Page No.

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities. See also related fields: 16 Missile Technology, 17 Navigation, Communications, Detection, and Countermeasures, 20 Physics, and 22 Space Technology..... 1, S-1

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Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology. See also related field: 06 Biological and Medical Sciences..... 20, S-5

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Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects. See also related fields: 02 Agriculture, 05 Behavioral and Social Sciences, and 07 Chemistry..... 33, S-9

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TECHNICAL ABSTRACT BULLETIN

01. Aeronautics

AD-617 273 Div. 33/1
CFSTI Prices: HC$2.00 MF$0.50

Naval Weapons Evaluation Facility, Albuquerque, N. Mex.
THE CIRCULAR RUNWAY.
Apr 65, 39p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Runways, Design), Landings, Take-off, Airports, Costs, Geometric forms, Feasibility studies, Rings, Wind, Aviation safety, Taxiing.

Advantages of a circular runway: unlimited runway available for both takeoff and landing; design allows unlimited flexibility in planning approach and departure corridors; dilution of the cross-wind problem; provides an inherent stable tracking feature; affords minimum required taxi distance and maximum runway access for the crash crews; affords optimum control tower placement; allows optimum placement of navigation aids; requires a smaller total area than a comparable conventional airport; the center building complex allows optimum passenger access to and departure from aircraft; rapid aircraft departures and arrivals possible; affords optimum low visibility procedures; compactness derived in the building complex; design contributes to noise abatement; actual flameout and dead-stick approaches possible.

AD-617 292 Div. 9/7
CFSTI Prices: HC$3.00 MF$0.75

Texas A and M Univ., College Station.
THE AERODYNAMIC CHARACTERISTICS OF AN AIRFOIL UTILIZING BOUNDARY LAYER AND CIRCULATION CONTROL.
Master's thesis,
by Edward Milton Boothe. Aug 65, 55p
Unclassified report

Descriptors: (*Airfoils, Boundary layer control), (*Boundary layer control, Airfoils), Wing inlets, Area suction, Trailing control surfaces, Aircraft, Aerodynamic characteristics, Tests, Wind tunnels, Experimental data.

This study was conducted to investigate experimentally the change in airfoil characteristics brought about by the simultaneous application of boundary layer control through leading edge blowing and circulation control through trailing edge suction, to detect the changes in lift resulting from leading edge blowing, to determine if any benefit could be derived by simultaneously applying trailing edge suction at a mass flow rate equal to that of the blowing, and to investigate the associated changes in pressure drag and pitching moment.

AD-617 293 Div. 9/7
CFSTI Prices: HC$3.00 MF$0.75

Texas A. and M. Univ., College Station.
THE EFFECT OF TANGENTIAL MASS ADDITION ON THE BOUNDARY LAYER VELOCITY DISTRIBUTION OF A FLAT PLATE AT ZERO ANGLE OF ATTACK.
Master's thesis,
by Edward Peter Miller. Aug 65, 66p
Unclassified report

Descriptors: (*Flat plate models, Boundary layer), (*Boundary layer, Flat plate models), Velocity, Distribution, Angle of attack, Experimental data.

AD-617 354 Div. 1/4, 1/2
CFSTI Prices: HC$4.00 MF$0.75

Douglas Aircraft Co., Inc., Long Beach, Calif.
AIRCRAFT MOTION ANALYSIS,
by J. A. Thelander. Mar 65, 108p
Contract AF33 616 6460, Proj. 8219, Task 821902
FDL TDR-64-70
Unclassified report

Descriptors: (*Aircraft, Motion), (*Flight, Aerodynamic characteristics), Differential equations, Sloshing, Stability, Pitch(Motion), Turbulence, Moments, Transformations(Mathematics), Design, Force(Mechanics).

The report is a compilation of coordinate systems, equations, and general relations used in aircraft-motion analysis. The information is useful for comparative evaluation and for preliminary-design work. Simplified and approximate solutions are given for special flight conditions. The material is defined and presented in a form suitable for direct application. Derivation and theoretical development are not emphasized, but sources thereof are named. (Author)

AD-617 385 Div. 33/1, 33/2
CFSTI Prices: HC$7.00 MF$2.00

Foreign Technology Div., Wright-Patterson AFB, Ohio.
RIGID PAVEMENTS OF AIRPORTS,
by B. S. Raev-Bogoslovskii, G. I. Glushkov, A. S. Tkachenko, L. I. Manvelov, and A. V. Mikhailov.
25 Mar 65, 369p FTD-MT-64-116
TT 65-62560
Unclassified report

Edited machine trans. of mono. Zhestkie Polrytiya Aerodromov, Moscow, 1961 p1-322. Available copy will not permit fully legible reproduction.

Descriptors: (*Airports, Pavements), (*Pavements, Airports), (*Landing fields, Pavements), Concrete, Reinforced concrete, Textbooks, USSR.

Contents:
Experience of operation of rigid pavements
Bases of rigid pavements of airports
Single-layer airport pavements
Two-layered pavements
Pavements of prestressed concrete and reinforced

concrete
Structures of prestressed pavements
Building of monolithic prestressed pavements
Sectional pavements of prestressed reinforced concrete slabs
Experimental check of the work of rigid pavements
Calculation of airfield pavements.

AD-617 421 Div. 9/6

Air Material Command, Wright-Patterson AFB, Ohio. Engineering Div.
THE FLOW OVER A WEDGE PROFILE AT MACH NUMBER ONE,
by Gottfried Guderley and Hideo Yoshihara.
Jul 49, 45p Rept. no. AF-TR-5783
ATI 57 842
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Wedges, Transonic flow), (*Transonic flow, Wedges), Drag, Angle of attack, Numerical analysis, Boundary value problems.

The flow over a wedge-shaped profile at zero angle of attack and with a free stream Mach number of one is computed using the hodograph method as simplified by the transonic law of similarity. Drag coefficients are computed for several profiles. (Author)

AD-617 544 Div. 33/1
CFSTI Prices: HC$3.00 MF$0.75

Air Force Flight Dynamics Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
SOD AND MATTED LANDING SURFACE ROUGHNESS CHARACTERISTICS.
Technical memo. for Aug-Sep 64,
by B. H. Groomes. Dec 64, 54p
Rept. no. FDDS-TM-64-32
Proj. 1370, Task 137008 Unclassified report
Descriptors: (*Runways, Surface properties), Aluminum, Steel, Soils, Taxiing, Landings, Take-off, Surfaces.

Limited sod and matted surface characteristics in the form of profile and power spectral density plots, discrete bump and dip distributions and maximum heights and depths for various wavelengths are presented. The power spectral densities for the sod and multi-matted surfaces show higher roughness characteristics than the power spectral density for the roughest prepared surface which had been previously established from a survey of 25 air bases throughout the United States. Also, for the limited data gathered, the multi-matted surface was rougher than the sod surface. When a comparison is made between the M9M1 and Convair aluminum matting and the pierced steel planking, it is apparent that the higher roughness characteristics of the multi-matting are due primarily to the pierced steel planking. Significant discrete and narrow band power peaks are evident in the power spectra of the matted surface over the reduced frequency range of approximately 6 radians per foot to .2 radian per foot which corresponds to wavelengths ranging from approximately one foot to thirty feet. To a lesser degree, peaks are also present in the power spectra of the sod field. (Author)

AD-617 551 Div. 9/6, 9/2
CFSTI Prices: HC$3.00 MF$0.75

Air Force Weapons Lab., Kirtland AFB, New Mex.
SOME COMMENTS ON NEWTONIAN IMPACT THEORY.
Rept. for Apr 64-Apr 65,
by Chester F. Dean. Jun 65, 71p
Rept. no. WL TR-64-176
Proj. 5797, Task 5797120 Unclassified report
Descriptors: (*Impact shock, Hypersonic flight), (*Hypersonic flight, Aerodynamic characteristics), High altitude, Atmosphere entry, Pressure, Shock waves, Angle of attack, Reentry vehicles, Conical bodies, Programming(Computers).

The theory is discussed which is basic to the understanding of the Newtonian impact theory and high-speed, high-altitude aerodynamics. Curves are presented for cones with semicone angles from 10 to 20 degrees in increments of 1 degree plotted with the various aerodynamic coefficients against cone angle of attack (from 0 to 15 degrees). A computer listing of the program which generated these curves is also presented. Curves are provided which can be used in most ICBM trajectory programs which utilize cone-shaped reentry vehicles. Other shapes can be utilized based on the theory presented but only the cone has been developed in this report. (Author)

AD-617 567 Div. 1/1, 30/5
CFSTI Prices: HC$6.00 MF$1.25

Curtiss Div., Curtiss-Wright Corp., Caldwell, N. J.
RESEARCH ON ACCELERATED RELIABILITY TESTING METHODS APPLICABLE TO NON-ELECTRONIC COMPONENTS OF FLIGHT CONTROL SYSTEMS.
Final technical rept. for 1 May 63-1 May 64,
by W. F. Johnson. Mar 65, 202p
Contract AF33 657 11080, Proj. 8225, Task 822502
AFFDL TR-64-181 Unclassified report
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Test methods, Flight control systems), (*Flight control systems, Reliability), (*Failure(Mechanics), Test methods), Servomechanisms, Life expectancy, Data processing systems, Malfunctions, Costs, Effectiveness, Systems engineerings.

The study is concerned with the development of techniques for the testing of electromechanical components in time compressed form. The motivating basis for this work is that presently used statistical testing methods require large numbers of samples and long testing periods to compile meaningful MTBF data. The approach employed herein included: System failure mode analysis, Classification and ranking of failure modes in terms of influence and frequency of occurrence, Physics of failure analysis at part and material levels. 'Measured weakening' (pre-cracking) technique was developed and applied to the most predominate failure parts to generate failures in reasonably short test times. In addition, extraneous or unwanted failures were not produced, which is frequently the case when 'over load' testing is employed. An all mechanical position servo unit was selected as a typical energy conversion flight control system component on which tests were conducted to verify the developed techniques for accelerating reliability testing. The tests results indicated that 'measured weakening' of mechanical parts can be employed to reduce the number of samples required and the test time involved to perform reliability testing. (Author)

AD-617 602 Div. 1/1
CFSTI Prices: HC$3.00 MF$0.75

Bell Helicopter Co., Fort Worth, Texas.

1964 ANNUAL JOINT ARMY-NAVY AIRCRAFT INSTRUMENTATION RESEARCH PROGRESS REPORT.
Technical rept.,
by H. W. Upton, J. Marvin Willis, and Dora J. Dougherty.
Aug 64, 57p Rept. no. D288-100-009
Contract Nonr167000

Unclassified report

Rept. on Proj. JANAIR. See also AD-435 733.

Descriptors: (*Helicopters, Human engineering), (*Display systems, Helicopters), Flight simulators, Vertical indicators, Ground position indicators, Flight instruments, Television display systems, Navigation charts, Flight testing, Simulation, Horizontal indicators, Hovering, Landings, Take-off, Navigation aids, Landing aids.

The report describes work which was accomplished in the areas of engineering and human factors flight tests of the RH-2 (Research Helicopter Number Two), human factors flight simulation evaluations of the contact analog vertical display, and experimentation of map features for the navigation display. The evaluative studies are presented with performance data and brief results and conclusions. (Author)

AD-617 622 Div. 9/7
CFSTI Prices: HC$3.00 MF$0.75

Polytechnic Inst. of Brooklyn, N. Y.
AN EXPERIMENTAL INVESTIGATION OF THE NEAR WAKE OF A SLENDER CONE AT MACH NUMBER =8 AND 12,
by Robert J. Cresci and Victor Zakkay. May 65, 54p
Contracts AF33 616 7661, AF49 638 1391,
Projs. 7064, 9781, Tasks 706401, 978101
ARL 65-87

Unclassified report

Descriptors: (*Slender bodies, Hypersonic characteristics), (*Conical bodies, Hypersonic characteristics), Wake, Stagnation point, Aerodynamic heating, Heat transfer, Laminar boundary layer, Turbulent boundary layer, Pressure.

Various experimental data were obtained in the near wake region of a 10 degree angle sharp cone at free stream Mach numbers of 8.0 and 11.8. The Mach 8.0 tests were conducted at free stream Reynolds numbers of 300,000 and 1,700,000 per foot; laminar and turbulent boundary layers were obtained on the cone surface at these respective Reynolds numbers. Data obtained include radial profiles of temperature, pressure, and Mach number at axial locations between one and three base diameters downstream of the model. Heat transfer and pressure distributions on the model base were also obtained. The Mach 11.8 tests were conducted at a free stream Reynolds number of 600,000 per foot and the surface boundary layer for all these tests were laminar. Data obtained include centerline distributions of Mach number, pressure, and temperature for a distance between one and four base diameters downstream of the model. Centerline temperatures were also obtained in the recirculation region for model wall to stagnation temperature ratios of 0.06 and 0.47. In addition, total temperature profiles were obtained downstream of the rear stagnation point. (Author)

AD-617 624 Div. 9/6

Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
LONGITUDINAL FLOW OVER A CIRCULAR CYLINDER WITH SURFACE MASS TRANSFER.
Revised ed.,
by D. J. Wanous and E. M. Sparrow. 19 Aug 64, 3p
Grant AF AFOSR17 64
AFOSR 65-0922 Unclassified report

Pub. in A I A A Journal v3 n1 p147-9 Jan 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 30 Mar 64.

Descriptors: (*Cylindrical bodies, Laminar boundary layer), (*Laminar boundary layer, Transport properties), Partial differential equations, Aerodynamic loading, Drag, Axially symmetric flow, Perturbation theory, Series.

Consideration is given to axisymmetric laminar boundary-layer flow longitudinal to a circular cylinder with continuously-distributed mass injection (blowing) or mass removal (suction) at the surface. Such a flow differs from that along a flat plate because of the transverse curvature of the cylindrical surface. The transverse curvature effect gives rise to nonsimilar boundary-layer solutions. The present analysis is carried out for constant property, incompressible flow. In the case of mass addition, the properties of the injected gas are identical to those of the main-stream gas.

AD-617 644 Div. 9/6

Graduate Aeronautical Labs., Calif. Inst. of Tech., Pasadena.
ON THE VISCOUS HYPERSONIC BLUNT BODY PROBLEM,
by William B. Bush. 27 Apr 64, 15p Pub-595

Unclassified report

Pub. in Journal of Fluid Mechanics v20 pt3 p353-67 1964 (Copies available only to DDC users).

Descriptors: (*Blunt bodies, Hypersonic characteristics), (*Hypersonic flow, Blunt bodies), Compressible flow, Shock waves, Partial differential equations, Viscosity, Boundary layer, Axially symmetric flow.

AD-617 653 Div. 9/6

Massachusetts Inst. of Tech., Cambridge. Dept of Mechanical Engineering.
THEORY OF STAGNATION-POINT HEAT TRANSFER IN IONIZED MONATOMIC GASES,
by Michael L. Finson and Nelson H. Kemp.
13 Jul 64, 4p
Contract Nonr184193; Grant AF AFOSR353 63

Unclassified report

Pub. in Physics of Fluids v8 n1 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Heat transfer, Stagnation point), (*Xenon, Heat transfer), (*Argon, Heat transfer), Gas ionization, Frozen equilibrium flow, Transport properties, Boundary layer, Aerodynamic heating.

Calculations were made for the stagnation-point geometry for both the frozen and equilibrium boundary layers in ionized argon and xenon.

AD-617 681 Div. 9/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SIMILITUDE LAWS FOR A FLOW OF GAS IN A THIN HYPERSONIC NOZZLE,

by Yu. L. Zhilin. 2 Jul 65, 11p
Rept. no. FTD-TT-65-690
TT 65-62595

Unclassified report

Unedited rough draft trans. of Inzhenernyi Zhurnal (USSR) v3 n4 p628-31 1963.

Descriptors: (*Nozzle gas flow, Hypersonic flow), (*Hypersonic nozzles, Boundary layer), Mathematical analysis, Equations, Thickness, Statics, Enthalpy, USSR.

A similitude law for flow of gas in a hypersonic nozzle taking into account the interactions of the boundary layer with a potential nucleus similar to the similitude law for external flow past thin bodies established by Lunev and Hayes and Pradstein is obtained. (Author)

AD-617 685 Div. 9/1, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
COSMIC VELOCITIES AND THE RESISTANCE OF MEDIA. NEW THEORIES AND CHEMICAL PHENOMENA AT HIGH VELOCITIES,
by G. I. Polrovskii. 1 Jul 65, 10p
Rept. no. FTD-TT-65-614
TT 65-62599

Unclassified report

Unedited rough draft trans. of Priroda (USSR) v51 n3 p105-7 1962.

Descriptors: (*Gas flow, Chemical reactions), (*Plasma sheath, Theory), (*Aerodynamic heating, Gas ionization), Vaporization, Hypersonic flow, Combustion, Electromagnetic properties, USSR.

A semi-technical discussion is given of phenomena connected with the interaction of a solid body with its medium at very high velocities. Topics include the increase of resistance (over classical aerodynamic resistance) due to vaporization and burning, the mantel of incandescent gases, and the effect of the electromagnetic properties of the body on resistance to its motion.

AD-617 701 Div. 9/6
CFSTI Prices: HC$2.00 MF$0.50

New York Univ., N. Y.
THE RADIAL VARIATION OF THE EDDY VISCOSITY IN COMPRESSIBLE TURBULENT JET FLOWS.
Interim rept.,
by Victor Zakkay and Egon Krause. May 65, 39p
Contract AF33615-1516, Proj. 7064
ARL 65-89

Unclassified report

Descriptors: (*Jets, Viscosity), (*Viscosity, Jets), (*Compressible flow, Turbulence), Jet mixing flow, Argon, Hydrogen, Xenon, Air, Momentum, Numerical analysis.

AD-617 732 Div. 9/6, 9/7
CFSTI Prices: HC$4.00 MF$0.75

Research and Advanced Development Div., AVCO Corp., Wilmington, Mass.
TURBULENT MIXING OF AXISYMMETRIC JETS OF PARTIALLY DISSOCIATED NITROGEN WITH AMBIENT AIR.
Final technical rept., for Feb 64-Jun 65,
by T. J. O'Connor, E. H. Comfort, and L. A. Cass.
15 Jul 65, 115p Rept. no. RAD-TR-65-18
Contract Nonr330700

Unclassified report

Descriptors: (*Heat transfer, Jets), (*Jet mixing flow, Turbulence), Axially symmetric flow, Nitrogen, Dissociation, Fluid dynamic properties, Compressible flow, Surfaces, Stagnation point, Blunt bodies, Enthalpy.

Recent attempts to predict the heat transfer from a high enthalpy, compressible free jet impinging upon surfaces in its path have suffered from a complete lack of knowledge concerning the behavior of turbulent jets of dissociated gases. Although it had been assumed that high enthalpy gas streams would exhibit the characteristics of cold jets, which have been subjected to extensive study, there had been no experimental evidence to support this contention. A research program was conducted to determine radial and axial variations in fluid properties, i.e., velocity, density, enthalpy, etc., in compressible free jets of dissociated gases produced by electric-arc plasma generators. Experimental investigations were confined to the near flowfield of the jets, since 90 percent of change in jet fluid properties, from their initial values at the arc nozzle-exit plane to the properties of the ambient fluid, was accomplished within 40 nozzle radii from the jet origin. Heat-transfer rates from these jets, when impinging upon a flat surface perpendicular to the jet axis, were determined experimentally. Correlation of this data could then be accomplished by means of a relationship similar to those for stagnation-point heat transfer to blunt bodies in a uniform stream when local jet properties were employed. (Author)

AD-617 748 Div. 1/2, 1/4
CFSTI Prices: HC$3.00 MF$0.75

Army Aviation Materiel Labs., Fort Eustis, Va.
SUGGESTED REQUIREMENTS FOR V/STOL FLYING QUALITIES.
Research technical memo,
by Paul R. Curry and James T. Matthews, Jr.
Jun 65, 55p USAAML-TR-65-45, RTM-37

Unclassified report

Descriptors: (*Short take-off planes, Performance-(Engineering)), (*Vertical take-off planes, Performance-(Engineering)), Flight, Specifications, Aerodynamic characteristics, Military requirements.

This Research Technical Memorandum presents suggestions for a specification on flying and handling qualities requirements for subsonic V/STOL aircraft. In addition to including the ideas of many others, the authors have incorporated two basic suggestions: (1) the use of a pilot rating system (since the ultimate measures of handling qualities are determined by the pilot) and (2) the use of servo-analysis techniques and terms to define quantitative requirements. There are no statistical or quantitative data available to verify the stated requirements in some cases; however, the requirements are based on many different V/STOL research aircraft funded by the U. S. Army and flown by U. S. Army pilots. (Author)

AD-617 763 Div. 1/4, 33/1
CFSTI Prices: HC$2.00 MF$0.50

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
NOISE CONTOURS FOR SHORT AND MEDIUM RANGE

TRANSPORT AIRCRAFT AND BUSINESS AIRCRAFT.
Technical rept.,
by Dwight E. Bishop. Mar 65, 47p
Contract FA64WA4949
FAA-ADS 35

Unclassified report

Descriptors: (*Transport planes, Airplane noise), (*Commercial planes, Airplane noise), (*Airplane noise, Transport planes), Airplane engine noise, Jet engine noise, Measurement, Take-off, Landings, Airports.

Generalized noise contours, in terms of the perceived noise level, are presented for takeoff and landing operations of: a) two and three engine, short and medium range turbojet and turbofan transport aircraft, (Boeing 727, BAC 1-11, Douglas DC-9 and Sud Aviation Caravelle 3 and 6); b) multi-engine turbojet and turbofan business aircraft (Jet Commander 1121, Dassault Falcon, Hawker Siddeley D. H. 125, Lear Jet 23, Lockheed JetStar and North American Sabreliner); and c) two-engine propeller transport and business aircraft. Estimates of ground runup noise for aircraft in groups a) and b) above are also presented. The noise contours are based on noise measurements and estimates. The noise contours extend the scope of aircraft noise information for land use planning in the vicinity of airports. The noise information should be particularly helpful in describing the noise environment in and about smaller airports not regularly handling military or large civil jet transport aircraft. (Author)

AD-617 764 Div. 33/1, 1/9
CFSTI Prices: HC$3.00 MF$0.75

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
HELICOPTER NOISE CHARACTERISTICS FOR HELIPORT PLANNING.
Technical rept.,
by Dwight E. Bishop. Mar 65, 70p
Contract FA64WA4949
FAA-ADS 40

Unclassified report

Descriptors: (*Helicoptors, Engine noise), (*Engine noise, Helicopters), (*Airports, Engine noise), Urban areas, Noise, Take-off, Landings, Hovering, Landing fields, Site selection, Auditory perception.

The report presents technical information and procedures for estimating the noise levels produced by current civil and military helicopters (piston- and turbine-powered) during varied flight and ground operations. Information and procedures are also presented for comparing helicopter noise with other vehicle noise, and with ambient noise found in tupical urban and suburban areas. These procedures permit an assessment of the extent to which helicopter noise is compatible with typical land uses (residential, commercial, industrial, etc.) in areas near heliports. Noise data and procedures are presented in simplified fashion. The information may be readily used by those without specialized acoustical training but who are concerned with the location and development of a heliport, or with land planning or land zoning in the vicinity of heliports. (Author)

AD-617 765 Div. 33/1, 1/4
CFSTI Prices: HC$2.00 MF$0.50

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
FACTORS INFLUENCING THE NOISE EXPLOSURE UNDER THE LANDING PATH FOR JET TRANSPORT AIRCRAFT.
Technical rept.,
by A. C. Pietrasanta. Mar 65, 37p
Contract FA64WA4949
FAA-ADS 39

Unclassified report

Descriptors: (*Jet transport planes, Jet engine noise), (*Turboprop engines, Engine noise), (*Jet engine noise, Flight paths), (*Flight paths, Jet engine noise), Airports, Landings, Runways, Turbojet engines, Auditory perception.

On the basis of available acoustical data calculations have been made to determine the quantitative effect on the noise exposure under the landing path of changes in runway threshold location, glide slope angle, and engine power setting. Each of these factors has been examined independently, i.e. with all other conditions held constant, for operation of a turbofan-powered Convair 990 and a turbojet-powered Boeing 707-120. Changes in noise exposure are described in terms of changes in perceived noise level and/or changes in the area enclosed by equal perceived-noise-level contours for a range in glide slope angles from 2-1/2 to 6 degrees, runway threshold displacements of 1000 feet and 2000 feet, and four different engine power settings from approximately 60% thrust downward. The results can be generalized to apply to essentially all four-engine commercial jet airliners in operation today. They provide the basis whereby changes in these factors can be evaluated in terms of their effectiveness in reducing noise exposure alone. Further, trading relationships among changes in these factors can be derived from the data. (Author)

AD-617 766 Div. 33/1, 1/4
CFSTI Prices: HC$3.00 MF$0.75

Bolt, Beranek, and Newman, Inc., Los Angeles, Calif.
STUDY OF THE EFFECT OF DEPARTURE PROCEDURES ON THE NOISE PRODUCED BY JET TRANSPORT AIRCRAFT.
Technical rept.,
by W. J. Galloway, A. C. Pietrasanta, and K. S. Pearsons. Mar 65, 68p
Contract FA64WA4949
FAA-ADS 41

Unclassified report

Descriptors: (*Jet transport planes, Jet-engine noise), (*Jet engine noise, Take-off), (*Take-off, Jet engine noise), Airports, Operation, Flight paths, Auditory perception.

The effect of various departure procedures of commercial jet transport aircraft on the noise produced on the ground under the departure path are presented. Noise data at four measurement stations under the flight path of Runway 13R at John F. Kennedy International Airport, New York, were obtained from 300 aircraft departures. Four different classes of departure procedures, including those specified by current airline operating practices, are compared with the noise produced by a random set of aircraft operations where the departure procedure was unspecified. Detailed radar observations of the aircraft flights, operational information reported by pilots flying specified procedures, and the measured noise data on all flights observed were used in evaluating the various departure procedures. The study shows that implementation of a proposed departure procedure could reduce the noise levels on the ground under jet transport takeoffs by as much as 8 PNdB as compared to the noise produced by existing procedures. (Author)

AD-617 774 Div. 33/1, 2/7
CFSTI Prices: HC$2.00 MF$0.50

Travelers Research Center, Inc., Hartford, Conn.
FURTHER STUDIES OF SPACE AND TIME VARIATIONS IN ATMOSPHERIC TRANSMISSION ALONG AIRPORT RUNWAYS.
Technical rept.,
by Keith D. Hage and Herbert D. Entrekin.
Mar 65, 37p Rept. nos. TR-3, 7468-143
Contracts FA65WA1192, Cwb10704, Proj. 150 535 02A
SRDS RD-65-6;PB 167 496 canceled
Unclassified report

Descriptors: (*Runways, Visibility), (*Light transmission, Atmosphere), (*Air traffic control terminal areas, Visibility), (*Atmosphere, Light transmission), Time, Atmospheric precipitation, Fog, Correlation techniques, Visual perception.

Space and time variations of transmission of visible light in the atmosphere during fog and precipitation are examined in detail as a preliminary step in the development of suitable short-period prediction techniques to be used at aviation terminals. This study is based primarily on data from three transmissometers along runways at John F. Kennedy International Airport, New York. The relative space scales of various classes of obstructions-to-vision are estimated and compared with similar estimates based on data from the National Aviation Facilities Experimental Center at Atlantic City, N. J. The apparent movement of the transmission field is derived and is related, insofar as possible, to advective and warm frontal movements. The potential predictability of linear translation of the transmission field is evaluated for periods of 5 to 25 minutes. Conditional frequencies of runway visual range for selected space and time lags are presented and compared with those found for Atlantic City Airport. (Author)

AD-617 805 Div. 9/6, 9/1

Massachusetts Inst. of Tech., Cambridge.
Dept. of Mathematics.
HEAT TRANSPORT BY TURBULENT CONVECTION,
by Louis N. Howard. 5 Apr 63, 28p
Unclassified report

Research supported in part by Office of Naval Research, Washington, D. C.
Pub. in Journal of Fluid Mechanics v17 pt3 p405-32 nd (Copies available only to DDC users).

Descriptors: (*Heat transfer, Turbulence), (*Fluid flow, Transport properties), Mathematical models, Temperature, Mathematical analysis, Equations.

Upper bounds for the heat flux through a horizontally infinite layer of fluid heated from below are obtained by maximizing the heat flux subject to (a) two integral constraints, the 'power integrals', derived from the equations of motion, and (b) the continuity equation. This variational problem is solved completely, for all values of the Rayleigh number R, when only the constraints (a) are imposed, and it is thus shown that the Nusselt number N for any statistically steady convective motion cannot exceed a certain value N1(R), which for large R is approximately the square root of (3R/64). When (b) is included as a constraint, the variational problem is solved for large R, under the additional hypothesis that the solution has a single horizontal wave number; the associated upper bound on the Nusselt number is (R/248) to the 3/8 power. The mean properties of this maximizing 'flow', in particular the mean temperature and mean square temperature deviation fields, are found to resemble the mean properties of the real flow observed by Townsend; the results thus tend to support Malkus's hypothesis that turbulent convection maximizes heat flux. (Author)

02. Agriculture

AD-617 390 Div. 32/1, 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE EFFECT OF GIBBERELLIN AND OTHER BIOLOGICALLY ACTIVE SUBSTANCES ON POTATO VIRUSES,
by L. K. Zherebchuk. Jun 64, 11p
Trans-1120
TT 65-60173 Unclassified report

Trans. of Mikrobiologichnyi Zhurnal (USSR) 1963, v25 n5 p8-13.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Potatoes, Virus diseases), Growth substances, Viruses, Sprays, Agriculture, USSR.

Conclusions:
Treatment of potato plants in the budding stage with a solution of gibberellin, in particular gibberellin mixed with heteroauxin, retards the spread of virus infections. On the basis of serological analyses it was established that the number of plants affected with the viruses of rugose mosaic had not increased by the end of the vegetative period. Gibberellin in a concentration of 25-100 mg/1, as well as gibberellin mixed with heteroauxin, is good prophylaxis against potato viruses and favors the increase in tuber yield and starch content during the year in which it is used and also has the same aftereffect. The other biologically active substances tested had a certain negative effect on the viruses, but did not influence the productivity of the potatoes. The preparation cansatin exerted no effect on the virus or the potato yield. (Author)

AD-617 555 Div. 32/1, 32/4
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON COLLECTIVE FARMS AND PRODUCER CO-OPERATIVES,
by Evsey D. Domar. Jun 65, 39p
Rept. no. P-2975
Unclassified report

Descriptors: (*Agriculture, Economics), (*Economics, Agriculture), Production, Costs, Commerce, Labor, Communism, Mathematical models, USSR.

The study consists of four parts: in the first, Ward's creation, called the 'Pure Model' of a co-op is re-worked with a generalized production function. The tenor of Ward's findings (based on a single-output, one-or-two-input function) is confirmed, but some of the results are made more definite, and one is reversed. The second part is a short digression on a co-op as a monopolist. In the third part, the co-op is faced with a supply schedule of labor; this makes the model much more realistic and reverses the paradoxical results of the 'Pure Model'. A summary and conclusions are presented in the fourth part.

AD-617 727 Div. 32/1, 16/4

Marshall Univ., Huntington, W. Va.
THE PHYSIOGNOMY OF VEGETATION: A QUANTITATIVE APPROACH TO VEGETATION GEOMETRY BASED UPON THE STRUCTURAL CELL CONCEPT AS THE MINIMUM SAMPLE SIZE, CONCEPTS AND ANALYTICAL METHODS.
May 64, 110p
Contract DA22 079eng322, Proj. 1T0 21701A131
Unclassified report

Available from U. S. Army Engineer Waterways Experiment Station Corps of Engineers, Vicksburg, Mississippi $2.00.

Descriptors: (*Plants(Botany), Analysis), (*Ecology, Plants(Botany)), Mapping, Geometric forms, Mathematical analysis, Forestry.

Contents:
The description of the vegetation physiognomy
The descriptive system
Spatial relations of vegetation (nearest neighbor distances, order of neighbor distance, correction for sampling area, mean distances between individuals in a sampling area)
Definitions of concepts and list of mathematical symbols
Field methods (symbols for structural elements and their use in the descriptive system)
Reduction of field data and preparation of the structural diagram
The interpretation of the structural diagram
Table of values for structural cell parameters
Table of values for measured and calculated mean nearest neighbor (Camp McCoy, Wisconsin).

AD-617 728 Div. 32/1, 16/4

Marshall Univ., Huntington, W. Va.
THE PHYSIOGNOMY OF VEGETATION: A QUANTITATIVE APPROACH TO VEGETATION GEOMETRY BASED UPON THE STRUCTURAL CELL CONCEPT AS THE MINIMUM SAMPLE SIZE. APPENDIX: FIELD DATA, STRUCTURAL DIAGRAMS AND SAMPLING AREA LOCATIONS OF THE VEGETATION OF CAMP McCOY, WISCONSIN.
May 64, 136p
Contract DA22 079eng322
Unclassified report

Available from U. S. Army Engineer Waterways Experiment Station Corps of Engineers, Vicksburg, Mississippi $2.00.
Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Plants(Botany), Analysis), (*Ecology, Plants(Botany)), Mapping, Geometric forms, Mathematical analysis, Forestry, Wisconsin.

The purpose of the publication is to supplement the research findings and interpretations presented in AD-617 727.

AD-617 841 Div. 16/14, 16/10

Armed Forces Inst. of Pathology, Army Medical Center, Washington, D. C.
THE PATHOLOGY OF MALIGNANT LYMPHOMA IN CATTLE: A STUDY OF 1113 CASES,
by Hilton A. Smith. 1964, 27p
Contract AT40 1 2784
Unclassified report

Research done in cooperation with Army Medical Research Lab., Fort Knox, Ky.
Pub. in Pathologia Veterinaria v2 p68-94 1965
(Copies available only to DDC users).

Descriptors: (*Bovines, Cancer), (*Cancer, Bovines),

Pathology, Histology, Cytology, Etiology, Tissues-(Biology), Cells(Biology), Morphology(Biology), Neoplasms, Sex, Aging(Physiology), Veterinary medicine.

About 1100 cases of malignant lymphoma were studied. Malignant lymphomas in cattle occur mostly at the older ages but they are by no means absent in the very young. Sex, breed and season of the year have little significance. Nearly all organs and tissues are susceptible to invasion, but some much more so than others, lymph nodes and heart being outstanding. Several histological types are described, as well as a relation to Hodgkin's disease. Reactions by eosinophils, plasma cells and other cells are described and an attempt made to evaluate them etiologically. Considerable evidence suggests that this neoplastic disease originates as an unsuccessful, generalized defensive reaction. (Author)

03. Astronomy and Astrophysics

AD-617 249 Div. 2/1, 22/6
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
STUDIES OF DETONATIONS AT IONOSPHERIC ALTITUDES UNDER PROJECT RED LAMP.
Air Force surveys in geophysics,
by N. W. Rosenberg, T. D. Conley, S. R. Curley, and A. H. Lorentzen. May 65, 49p
Rept. no. AFCRL-65-356; AFSG-163
Projs. 4691, 5633, Tasks 469109, 563310

Unclassified report

Descriptors: (*Atmospheric sounding, Ionosphere), (*Ionosphere, Detonations), (*Shock waves, Ionosphere), Sounding rockets, Blast, TNT, High altitude, Radio waves, Photographic techniques, Electron density, Radar, Instrumentation, Launching, Calibration.

Project RED LAMP consists of a series of launchings of sounding rockets with chemical payloads. The rockets are launched at the Eastern Test Range for the purpose of (a) Calibrating radio-frequency research instrumentation which is being used to study rocket phenomena. (b) Determining the position, growth and intensity of rocket-generated shock waves. (c) Defining the electron density gradients of the shock wave. The report consists of two papers concerning results from two RED LAMP launches during May 1964. The first paper is concerned with the interpretation of radio and optical measurements of these two launches in terms of a spherical expansion of a blast wave. The second paper is concerned with the analogy between spherical and cylindrical explosions at ionospheric altitudes and the relation between point TNT explosions and a rocket plume. (Author)

AD-617 338 Div. 2/1
CFSTI Prices: HC$6.00 MF$1.25

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INTERSTELLAR GAS DYNAMICS,
by S. A. Kaplan. Nov 59, 219p MCL-95
TT 60-15442

Unclassified report

Trans. of mono. Mezhzvezdnata Gazodinamika, Moscow, 1958 p1-212. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Interstellar matter, Dynamics), (*Gases, Interstellar matter), Astrophysics, Gas ionization, Magnetohydrodynamics, Temperature, Shock waves, Turbulence, Nebulae, Galaxies.

The basic methods of intersteHar gas dynamics are set forth. Included are: distribution and motion of interstellar gas; physical state of interstellar gas; discontinuities in the motion of interstellar gas; equations of motion of interstellar gas; Interstellar turbulence.

AD-617 349 Div. 2/1, 2/7
CFSTI Prices: HC$5.00 MF$1.00

Hebrew Univ., Jerusalem (Israel). Dept. of Meteorology.
NUMERICAL STUDIES OF PLANETARY CIRCULATIONS IN A MODEL ATMOSPHERE.
Final rept.,
by A. Huss. Mar 65, 161p
Grant AF AFOSR63 108
AFCRL 65-350

Unclassified report

Descriptors: (*Planetary atmospheres, Atmospheric motion), (*Atmospheric motion, Planetary atmospheres), (*Atmosphere models, Planetary atmospheres), Mathematical models, Astrophysics, Geophysics, Mathematical models.

The evolution of general circulation patterns was studied by means of two-level quasi-geostrophic models. Four different experiments were performed and compared to an earlier experiment in which the basic initial flow was assumed to be constant at each pressure level and the Rossby parameter did not depend on the latitude. The assumptions made in the different runs were respectively: (1) Maximum zonal flow at the central latitude. (2) Maximum zonal flow south of the central latitude. (3) Constant zonal flow at each pressure level and a latitudinal variation of the Rossby parameter. (4) Maximum zonal flow south of the central latitude and a latitudinal variation of the Rossby parameter. The evolving distribution of various field-variables was investigated and compared to the actual distributions observed in the atmosphere. The most significant results were obtained in the third run. Specifically only in this case did the asymmetrical distributions of the field-variables around the central latitude tend to develop in the direction of the asymmetries observed in the atmosphere. (Author)

AD-617 428 Div. 2/1

McDonald Observatory, Univ. of Texas, Austin.
ROTATION AND MASS OF THE MAGELLANIC-TYPE GALAXY NGC 4631.
Technical rept. (Revised ed.),
by Gerard de Vaucouleurs and Antoinette de Vaucouleurs.
10 Sep 62, 19p Rept. no. TR-1
Contract NONR37513, Proj. NR046 785

Unclassified report

Pub. in The Astrophysical Journal v137 n2 p363-75 Feb 15 1963
Revision of manuscript submitted 2 Apr 62 (Copies not available to DDC or Clearinghouse customers).
Rept. on Spectroscopic and Radial Velocity Survey of Bright Galaxies.

Descriptors: (*Galaxies, Celestial mechanics), (*Astrophysics, Galaxies), Rotation, Mass spectroscopy, Velocity, Hydrogen, Optical properties.

AD-617 429 Div. 2/1

McDonald Observatory, Univ. of Texas, Austin.
SEARCH FOR SYSTEMATIC ERRORS IN GALAXY REDSHIFT MEASUREMENTS.
Technical rept.,
by Gerard de Vaucouleurs and Antoinette de Vaucouleurs.
19 Oct 62, 14p Rept. no. TR-3
Contract NONR37513, Proj. NR046 785

Unclassified report

Pub. in The Astronomical Journal v68 n2 p96-107 Mar 1963 (Copies not available to DDC or Clearinghouse customers).
Rept. on Spectroscopic and Radial Velocity Survey of Bright Galaxies.

Descriptors: (*Galaxies, Optical properties), (*Astrophysics, Galaxies), (*Doppler effect, Galaxies), Spectroscopy, Astronomical data, Errors.

An analysis of all available galaxy redshift measurements from 10 different sources proves conclusively that the Lick and Mount Wilson data are free of systematic errors in excess of ±50 km/sec in the velocity range V<5000 km/sec. There is no significant systematic difference between velocities derived from low-dispersion or medium-dispersion spectrograms, nor between prism+lens optics and grating+ Schmidt optics for 186 multiply observed galaxies. The present material shows no indication of systematic error depending on galaxy type, exposure E, or nuclear magnitude m', as defined by Holmberg; in particular delta V/delta logE=+10±53, for 40 repeated observations (Lick), delta V/delta m'=-3±17, for 44 'pure' pairs, and deltaV/delta m'=+13±12, for 82 miscellaneous pairs. The optical and radio velocities of M31 and M33 are also in close agreement. Only the early Lowell data require a constant correction+67±14 km/sec. The average external mean errors of published redshifts range from 40 km/sec (Mt. Wilson b dispersion), to 55 (McDonald), 70 (Lick, Mt. Wilson a dispersion), and 110 (Lowell). The systematic dependence of mean redshift on galaxy type in the Virgo cluster and the large velocity dispersion in groups and clusters of galaxies cannot be explained by systematic errors in the redshift measurements. (Author)

AD-617 435 Div. 2/1, 20/2

California Inst. of Tech., Pasadena.
NEUTRON STARS,
by John N. Bahcall and Richard A. Wolf.
11 Jan 65, 5p
Contract Nonr22047; Grant NGR05 002 028

Unclassified report

Pub. in Physical Review Letters v14 n10 p343-6
Mar 8 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Neutrons, Stars), (*Stars, Neutrons), (*Astrophysics, Stars), Neutrinos, Neutron reactions, Cooling, Nuclear physics.

The main purposes of this note are (i) to present the results, and suggest the implications, of some approximate calculations for the neutrino cooling rates of neutron stars, and (ii) to point out that some current ideas regarding the constituents of neutron stars should be revised. The description in this paper of the states of a neutron star and the reactions by which it cools differ from the works of previous authors in that the effects of the strong interactions among all the hadrons (strongly interacting particles) present is included in an approximate way. The principal new results obtained (for densities not much greater than nuclear densities) are (i) the existence of effective masses for all the hadrons, (ii) differential shifts in the threshold densities at which various kinds of particles are produced, and (iii) much faster cooling rates than previous workers have estimated.

AD-617 438 Div. 2/1

California Inst. of Tech., Pasadena.
STELLAR EVOLUTION. I. THE APPROACH TO THE MAIN SEQUENCE,
by Icko Iben, Jr. 23 Nov 64, 27p
Contract Nonr22047; Grant NGR05 002 028

Unclassified report

Pub. in The Astrophysical Journal v141 n3 p993-1018
Apr 1 1965
Revision of manuscript submitted 18 Aug 64 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stars, Phase studies), (*Astrophysics, Stars), Nuclear reactions, Gravity, Energy, Hydrogen, Helium, Luminescence, Mass-energy relation.

The manner in which nuclear reactions replace gravitational contraction as the major source of stellar luminosity is investigated for model stars of population I composition in the mass range 0.5<M/M sun < 15.0. By following in detail the depletion of C(12) from high initial values down to values corresponding to equilibrium with N(14) in the C-N cycle, the approach to the main sequence in the Hertzspring-Russell diagram and the time to reach the main sequence, for stars with M > 1.25 M sun, are found to differ significantly from data reported previously. (Author)

AD-617 450 Div. 2/1, 25/7

Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
DEGREE OF IONISATION OF Fe LINES IN THE SOLAR SPECTRUM IN THE RANGE 170-220 A,
by E. Alexander, U. Feldman, and B. S. Fraenkel.
10 Dec 64, 2p
Grant AF EOAR64 70
AFOSR 65-0761

Unclassified report

Pub. in Physics Letters v14 n1 p40-1 Jan 1 1965
(Copies available only to DDC users).

Descriptors: (*Ionization, Iron), (*Iron, Solar spectrum), (*Solar spectrum, Ultraviolet radiation), Solar radiation, Line spectrum, Ultraviolet spectroscopy.

AD-617 482 Div. 2/1

McDonald Observatory, Univ. of Texas, Austin.
REDSHIFTS OF 92 GALAXIES.
Technical rept.,
by Nicholas U. Mayall and Antoinette de Vaucouleurs.
29 May 62, 8p Rept. no. TR-2
Contract NONR37513, Proj. NR046 785

Unclassified report

Pub. in Astronomical Journal v67 p363-9 Aug 1962
Lick Observatory Bulletin n574
(Copies not available to DDC or Clearinghouse customers).
Rept. on Spectroscopic and Radial Velocity Survey of Bright Galaxies.

Descriptors: (*Galaxies, Optical properties), (*Astrophysics, Galaxies), (*Doppler effect, Galaxies), Spectroscopy, Astronomical data.

In the present list of 92 redshifts of galaxies from spectrograms obtained with the 36-inch Crossley reflector between 1956 and 1960, 45 are first determinations which include mostly galaxies in groups and clusters (Fornax cluster), Haro's 'blue' galaxies and some galaxies of unusual structure. The reduction is homogeneous with that of the Lick redshifts published in 1956. The normal wavelengths of unidentified blends shortward of lambda 3900 A and present in many galaxy spectra have been determined. A comparison is made with the Mount Wilson-Palomar redshifts and previous Lick redshifts. The mean systematic differences are negligible. (Author)

AD-617 498 Div. 2/1

National Research Council of Canada, Ottawa (Ontario).
Div. of Radio and Electrical Engineering.

SURVEY OF 9.4CM RADIO EMISSION IN CASSIOPEIA AND CEPHEUS,
by R. RaghavaRao, W. F. Medd, L. A. Higgs, and N. W. Broten. 20 Mar 64, 15p Rept. no. NRC-8204
Unclassified report

Pub. in Monthly Notices of the Royal Astronomical Society v129 n2 p159-68 1965
(Copies available only to DDC users.)

Descriptors: (*Radio astronomy, Galaxies), (*Galaxies, Radio astronomy), (*Astrophysics, Galaxies), Microwave frequency, Extraterrestrial radio waves, Radiofrequency spectroscopy, Parabolic antennas.

Results of a detailed survey in the region of the galactic plane between longitudes of 101 degrees and 140 degrees are presented. The 10-metre parabolic reflector of the National Research Council of Canada was used in this investigation, with a radiometer centred at 3200 Mc/s and capable of detecting 0.1 degrees equivalent antenna temperature. In comparison with more central parts of the Milky Way, the emission from this region is not intense; however, some twenty-five sources have been detected, and the relevant estimates of flux density, source size, and emission measure are listed. (Author)

AD-617 566 Div. 2/1
CFSTI Prices: HC$3.00 MF$0.75

Oslo Univ. (Norway). Inst. of Theoretical Astrophysics.
SOLAR RADIO NOISE REGISTRATIONS AT THE OSLO SOLAR OBSERVATORY, 1960-64.
Scientific rept.,
by Oeystein Elgaroey. 1965, 86p
Rept. no. SR-7 (56)
Contract AF61 052 743
AFCRL 65-366
Unclassified report

Reprint of Report No. 16 in the Report Series of The Institute of Theoretical Astrophysics, Oslo, Norway.

Descriptors: (*Sun, Radio astronomy), (*Radio astronomy, Sun), (*Astrophysics, Sun), Solar radiation, Very high frequency, Extraterrestrial radio waves, Astronomical observatories, Sweden, Astronomical data.

Observations of solar radio noise has been made at the Oslo Solar Observatory since 1954. Until 1962 the observing frequency was 200 Mc/s, but local interference then disturbed the measurements so heavily that a change of frequency was necessary. The measurements are now made on 225 Mc/s. The equipment is operated from February 1 to November 30 each year. The mid-winter shut down is due to the low solar altitude (less than 10 degrees at meridian passage); ground reflections then are disturbing. This report contains the observational data for the period 1960-64 and is a continuation of report no. 12, in which the data for 1958-59 were collected. The description of the method of tabulation of data, which introduces the tables, is much the same as in the previous report. It is followed by a discussion of the measurements which show how the data compare with those of some other observatories.

AD-617 578 Div. 2/1

Florida Univ., Gainesville. Dept. of Physics and Astronomy.
SPECTRAL DISTRIBUTION OF THE DECAMETRIC RADIATION FROM JUPITER IN 1961,
by T. D. Carr, G. W. Brown, A. G. Smith, C. S. Higgins, and H. Bollhagen. 4 Apr 64, 19p
Unclassified report

Pub. in Astrophysical Journal v140 n2 p778-95 Aug 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Astrophysics, Jupiter), (*Jupiter, Radio astronomy), (*Radio astronomy, Jupiter), Extraterrestrial radio waves, High frequency, Very high frequency, Radiofrequency spectroscopy, Astronomical observatories, Florida, Australia, Chile.

Observations of the sporadic radiation from Jupiter were made in 1961 at observatories in Florida, in Australia, and in Chile, at various frequencies from 5 Mc/s to 85.5 Mc/s. A method was developed for computing the mean flux density for the apparition from measurements of peak flux density in consecutive 10-min intervals. Occurrence probability, peak flux density, and mean flux density for the apparition were determined as functions of frequency, and all three quantities were found to decrease monotonically with increase in frequency above 10 Mc/s. The decrease in mean flux density with increasing frequency indicated a spectral index in excess of 5.2 over much of the observed spectrum. Peak flux densities at 5 Mc/s and 10 Mc/s were about 10 to the minus 19th power W/sq m (c/s). No activity was detected at 85.5 Mc/s. The ratio of mean flux density to peak flux density for 1-min intervals during noise storms was found to be essentially independent of frequency, suggesting that there is no appreciable change of noise-burst shape with frequency. The mean power emitted at decameter wavelengths by Jupiter in 1961 was estimated to be about 5 X 10 to the 10th power watts, which is 1 or 2 orders of magnitude greater than that emitted at decimeter wavelengths. The average efficiency with which the solar-wind power incident on the Jovian magnetosphere is converted into decametric radiation power was estimated to be about 0.00001. (Author)

AD-617 657 Div. 2/1, 9/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN REMARKS ON THE ROLE OF RADIATION EFFECTS IN THE THEORY OF ASTRAL SHOCK WAVES,
by I. A. Klimishin. 18 May 65, 7p
Rept. no. FTD-TT-65-82
TT 65-62572
Unclassified report

Unedited rough draft trans. of Voprosy Kosmogonii (USSR) v9 p200-2 1963. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Shock waves, Stars), (*Stars, Thermodynamics), (*Thermodynamics, Stars), (*Astrophysics, Stars), Photochemistry, Thermal radiation, Gases, Fluid mechanics.

The influence of the effects of radiation on the parameters of the shock wave moving in the stellar atmosphere is briefly discussed.

AD-617 721 Div. 2/1
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
AN INTRODUCTION TO THE GEOLOGY OF THE MOON.

Special scientific rept.,
by Luciano B. Ronca. May 65, 38p
Rept. nos. AFCRL-65-357; SR-23
Proj. 8602, Task 860205
Unclassified report

Descriptors: (*Moon, Geology), (*Geology, Moon), Extraterrestrial topography, Lunar probes, Astronomy.

An introduction to the study of the moon is presented from a geological point of view. The most important theories on lunar features are presented and discussed, and new interpretations are proposed. Lunar physiography, stratigraphy and tectonics are described. The most important physiographic features are craters, terrae, maria, rilles, wrinkle ridges, rays, halos, mountain ranges, and alpine valleys. From the physiography it is possible to speculate on the geologic processes acting on the moon. These are 'space weathering', meteoritic impact, volcanism, ballistic transportation and sedimentation, electrostatic transportation, and tectonism. The stratigraphy has been determined by applying the law of superposition. The column consists of the Pre-Imbrian, Imbrian, Procellarian, Eratosthenian, and Copernican Systems. The future of lunar exploration is discussed. (Author)

AD-617 789 Div. 2/1
CFSTI Prices: HC$1.00 MF$0.50

Yale Univ., New Haven Conn. Observatory.
OBSERVATION OF FLARE STARS AND LUNAR LUMINESCENCE.
Final technical rept. for 1 Sep 63-31 Aug 64,
by James N. Douglas and E. F. Milone. 15 Jul 65, 13p
Grant Nonr G 00014 64, Proj. NR046 779
Unclassified report

Descriptors: (*Stars, Optical properties), (*Moon, Luminescence), (*Luminescence, Moon), Astrophysics, Instrumentation, Astronomical data.

AD-617 843 Div. 2/1

California Inst. of Tech., Pasadena.
GRAVITATIONAL COLLAPSE,
by Icko Iben and H. Bondi. 1964, 3p
Contract Nonr22047; Grant NGR05 002 028
Unclassified report

Pub. in Nature v203 n4950 p1202 Sep 12 1964
(Copies available only to DDC users).
Prepared in cooperation with King's Coll. Univ. of London (England).

Descriptors: (*Stars, Gravity), (*Gravity, Stars), Particles, Density, Integrals, Relativity theory.

The paper consists of Iben's comments on a letter by Bondi (Nature 202:275, 1964) concerning the determination of the number of particles in a static distribution of matter and radiation, and of Bondi's subsequent reply.

AD-617 852 Div. 2/1, 25/1

Microwave Lab., Stanford Univ., Calif.
STRUCTURE OF THE SOLAR CHROMOSPHERE,
by P. A. Sturrock. 1963, 6p Rept. no. ML-1167
Contract AF40 638 1321
AFOSR 65-1077
Unclassified report

Pub. in Nature v203 n4942 p285-6 Jul 18 1964
(Copies available only to DDC users).

Descriptors: (*Solar atmosphere, Acoustics), (*Astrophysics, Solar atmosphere), (*Acoustics, Solar atmosphere), Energy, Propagation, Thermodynamics, Mathematical models.

The theory that the radially increasing temperature of the solar atmosphere is due to propagation of non-thermal energy, such as, acoustic waves, is discussed.

AD-617 873 Div. 2/1

National Research Council of Canada, Ottawa (Ontario).
RADIO OBSERVATIONS OF THE REGION OF A TYPICAL SUPERNOVA REMNANT (IC443),
by L. A. Higgs. 1964, 10p Rept. no. NRC-8092
Unclassified report

Pub. in The Journal of the Royal Astronomical Society of Canada v59 p56-64 Apr 1965
(Copies available only to DDC users).

Descriptors: (*Radio astronomy, Supernovae), (*Supernovae, Radio astronomy), (*Extraterrestrial radio waves, Supernovae), Astrophysics, Stars, Gases, Radiofrequency spectroscopy.

Microwave observations at a wave-length of 9.4 cm. of the supernova remnant IC443 and surrounding region have been carried out at the Algonquin Radio Observatory. These, combined with observations at other frequencies, yield a spectral index for IC443 of 0.40 ± 0.03. Weak radio emission from the region north of the star Geminorum is detected and attributed to a gas cloud surrounding part of the I Geminorum association. It is suggested that the supernova remnant is situated at the edge of this cloud and that the exploded star was originally a member of the association. (Author)

AD-617 879 Div. 2/1, 25/5, 15/1
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
INHOMOGENEOUS COSMOLOGICAL MODELS I. CONFORMAL HOMOGENEITY,
by Dominic G. Edelen. Jul 65, 26p
Rept. no. P-3171
Unclassified report

Descriptors: (*Celestial mechanics, Conformal mapping), (*Astronomy, Relativity theory), Galaxies, Velocity, Density, Mathematical models, Astrophysics, Field theory.

Inhomogeneous cosmological models are obtained by a conformal transformation of the line element of the previous homogeneous models. While a detailed correspondence between the predicted properties of the models and observations remains to be demonstrated, the models exhibit a number of features not phenomenologically different from recent observational findings. Mass distributions can be found that reflect actual galactic clustering. For such clusters, the cluster centers have the same predicted distance-velocity relations as found in the homogeneous models and the same red shift relations to within terms of second order. In all cases, dispersion velocities relative to the cluster centers are exhibited. If the cluster centers are assumed to be equally spaced in space, their observed pattern will exhibit a uniform foreshortening for the more distant ones while the nearer objects will show nonuniform foreshortning. Deviations from a regular pattern thus show up in the near field and become asymptotically regular at large distances. (Author)

04. Atmospheric Sciences

AD-617 230 Div. 2/7, 20/1

Minnesota Univ., Minneapolis. School of Physics.
MAGNETIC-CLOUD-CHAMBER OBSERVATIONS OF LOW-ENERGY COSMIC-RAY ELECTRONS,
by James W. Schmoker and James A. Earl.
9 Nov 64, 3p
Contract Nonr71060

Unclassified report

Pub. in Physical Review v138 n1B pB300-2 Apr 12 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cosmic rays, Electrons), (*Electrons, Cosmic rays), (*Cloud chambers, Atmospheric sounding), (*Atmospheric sounding, Cloud chambers), Balloons, Flight paths, Manitoba, Nuclear physics, Geophysics, Astrophysics.

The flux of cosmic-ray electrons in the energy range 45<E<150 MeV was measured at balloon altitudes over a wide range of geomagnetic latitudes. The data obtained led to the following conclusions: (1) The flux of primary electrons in the above energy range is less than 35 particles/sq m-sec-sr. (2) The geomagnetic cutoff rigidity at Fort Churchill, Manitoba, is less than 45 MV; this is significantly less than the cutoff expected from the earth's interval field alone. (Author)

AD-617 240 Div. 2/7, 8/6

Stanford Electronics Labs., Stanford Univ., Calif.
MULTIPHASE PERIODIC VERY-LOW-FREQUENCY EMISSIONS.
Revised ed.,
by Neil Brice. 17 Sep 64, 9p
Grants AF AFOSR62 370, NSF G23875
AFOSR 65-0907

Unclassified report

Pub. in Radio Science Journal of Research NBS/USNC-URSI v69D n2 p257-65 Feb 1965(Copies available only to DDC users).

Descriptors: (*Atmospherics, Very low frequency), (*Radio waves, Meteorological phenomena), (*Meteorological phenomena, Radio waves), Whistlers, Magnetic recording systems, Radiofrequency spectroscopy, Spectrum analyzers, Geophysics.

When periodic very-low-frequency (VLF) emissions of more than one set are observed concurrently (multiphase emissions) the observation of three sets symmetrically spaced is surprisingly frequent. Evidence is presented which suggests that two sets represent a transient situation, and that the strength of one emission may depend on the strength of, and the elasped time since the preceding emission. The data are interpreted as evidence of a relaxation phenomenon in the generation of discrete VLF emissions, and a qualitative explanation of the stability of symmetrical three-phase emission is given. (Author)

AD-617 243 Div. 2/7
CFSTI Prices: HC$4.00 MF$0.75

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
RESEARCH ON TROPICAL RAINFALL PATTERNS AND ASSOCIATED MESO-SCALE SYSTEMS.
Quarterly progress rept. no. 8, 1 Jan-30 Apr 65,
by John F. Griffiths, Walter K. Henry, and Glenn B. Rumley, Jr. 30 May 65, 102p Ref-65-19T
Contract DA36 039SC89202,
Projs. 1VO14501B53A09 04, 311

Unclassified report

See also AD-422 347.

Descriptors: (*Rainfall, Central America), Atmospheric precipitation, Climatology, Hydrology, Costa Rica, Ecuador, Periodic variations, Statistical analysis, Meteorology, Tropical regions.

In order to identify meso-scale changes in the variance of precipitation methods have been devised using relationship between the means and standard deviations. The preliminary results are very promising. The index of sympathy is used to identify periods of presistant rainfall in geographical areas. The east coast of Costa Rica has a high persistance for some months. The distribution in time and space of rainfall with elevation is investigated for selected stations in Ecuador. (Author)

AD-617 245 Div. 2/7, 13/4
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
POLAR WEATHER LIMITATIONS ON CONSTRUCTION-PRELIMINARY ARCTIC SURVEY.
Technical rept. for Apr 64-Mar 65,
by N. S. Stehle. Jun 65, 49p Rept. no. TR-R-391
Proj. Y F015 11 01 003

Unclassified report

Descriptors: (*Weather forecasting, Arctic regions), (*Climatology, Arctic regions), Periodic variations, Atmospheric temperature, Wind, Solar radiation, Logistics, Construction, Civil engineering.

To provide generalized weather patterns for logistics and construction in the Arctic, five stations-Barrow, Resolute, Thule, Eureka, and Alert - were analyzed for temperature, wind, windchill, and sunlight-darkness. Although this was a small representation of northern-hemisphere stations, as well as only a portion of the factors affecting logistics and construction, some generalizations could be made as to trends in the weather with latitude and with type of location. Further studies should be conducted, investigating other stations and more factors, in order to develop valid generalized weather patterns. (Author)

AD-617 248 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Air Force Cambridge Research Labs., Bedford, Mass.
DATA PREVIOUS TO THE INTERNATIONAL GEOPHYSICAL YEAR I: 5577 (OI) LINE AT SACRAMENTO PEAK, NEW MEXICO.
Environmental research papers,
by G. J. Hernandez. May 65, 59p
Rept. nos. AFCRL-65-319; ERP-104
Proj. 7661, Task 766101

Unclassified report

Descriptors: (*Aurorae, Intensity), (*Sky brightness, Night sky), Upper atmosphere, Line spectrum.

Zenith intensity measurements of the 5577 (OI) green line of the night airglow taken at Sacramento Peak, New Mexico, previous to the International Geophysical Year are presented in tabular form. A discussion on the present knowledge of the night airglow features, instrumentation, and calibration of the instruments is also included. (Author)

AD-617 280 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

New York Univ., N. Y. School of Engineering and Science.
ANALYSIS OF BREAKING ATMOSPHERIC WAVES.
Master's thesis,
by Arthur D. Ward. Jun 65, 49p
Unclassified report

Descriptors: (*Atmosphere models, Gravity), (*Gravity, Atmosphere models), Partial differential equations, Incompressible flow, Boundary layer, Boundary value problems, Fluid mechanics.

The basic partial differential equations are derived for an atmospheric gravity wave at the internal interface of a two layer, incompressible model. The model has a parabolic, non-rotating lower boundary. These equations are numerically integrated by the method of characteristics for various values of two parameters which govern the shape of the parabolic lower boundary. An analysis is made for the effects of the modeling parameters on the point at which the wave begins to break.

AD-617 301 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Wisconsin Univ., Madison.
CHARACTERISTICS OF THE JET STREAM OVER SOUTH AMERICA.
Master's thesis,
by Merrill Doyle Stevens. 1965, 53p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.

Descriptors: (*Jet streams(Meteorology), South America), Atmospheric sounding, Air mass analysis, Wind, Meteorology, Climatology.

The subtropical jet stream is investigated during a winter period and its mean velocity and location determined over the west coast of South America. The area of study is along 75W longitude in the Southern Hemisphere and extends from 11 to 43S latitude. A method of isobaric profile analysis is proposed that allows the derivation of those wind reports missing from regularly scheduled aerological soundings. A wintertime 30-day series of upper air data is studied and vertical cross sections constructed of the mean zonal winds--one from all observed wind reports and the other of all observed winds plus those derived by the analysis method. Both cross sections are compared with similar seasonal investigations over South America, North America, Australia, and New Zealand. (Author)

AD-617 302 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

Wisconsin Univ., Madison.
A BALLOON-BORNE OPTICAL AEROSOL AND CLOUD DETECTOR.
Master's thesis,
by Serhij Pilipowskyj. 1965, 48p
Unclassified report

Descriptors: (*Meteorological instruments, Monitors), (*Cloud height indicators, Optical equipment), (*Aerosols, Meteorological instruments), Models(Simulations), Atmosphere, Balloons, Amplifiers, Electronic equipment, Refraction.

A balloon-borne aerosol and cloud detector is proposed for obtaining synoptic data on the vertical distribution of cloud and aerosol layers to a height of 30 km. The instrument measures the intensity of light scattered from a sampling volume and, if a size distribution of the particulates is assumed, their concentration can be determined. Various size distributions of hazes and clouds are considered. Their contribution, as well as that of the molecular atmosphere, to the signal detected by the instrument is calculated. A description of a laboratory model of the proposed instrument is included. (Author)

AD-617 303 Div. 2/7, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Wisconsin Univ., Madison.
DENSITY OF THE ATMOSPHERE ABOVE 120 KILOMETERS AS DERIVED FROM SATELLITE MEASUREMENTS.
Master's thesis,
by James Anthony Degiovanni. 1965, 63p
Unclassified report

Descriptors: (*Atmospheric sounding, Satellites(Artificial)), (*Satellites(Artificial), Atmospheric sounding), (*Atmosphere, Density), Celestial mechanics, Orbital trajectories, Perturbation theory, Drag, Solar radiation, Magnetic storms, Atmosphere models, Geophysics.

Satellite measurements have indicated that there are large time variations in density at heights above 200 km. These variations have been correlated with the level of activity of the sun, magnetic storms, and position on the earth relative to the sub-solar point. This paper is a survey of the use of satellite drag perturbations to measure atmospheric density. It includes a discussion of three of the most important atmospheric models that have resulted from satellite measurements, concluding with the Static Diffusion Models by Luigi G. Jacchia of the Smithsonian Institute. An extensive bibliography is included. (Author)

AD-617 307 Div. 2/7
CFSTI Prices: HC$4.00 MF$1.00

Saint Louis Univ., Mo.
AN INVESTIGATION OF HURRICANE ABBY, JULY 10-16, 1960.
Master's thesis,
by Tawatchai Rajawatana. 1965, 118p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.

Descriptors: (*Tropical cyclones, Marine meteorology), (*Marine meteorology, Tropical cyclones), (*Hurricane tracking, Marine meteorology), Atlantic Ocean, Air mass analysis, Meteorological charts.

The study is confined to the time of reintensification, July 14-15, 1960, over the western Caribbean Sea.

AD-617 309 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.50

Saint Louis Univ., Mo.
INTERDIURNAL TEMPERATURE VARIATIONS BETWEEN 30 AND 60 KILOMETERS.
Master's thesis,
by Dee G. Sullins, Jr. Jun 65, 51p Unclassified report

Descriptors: (*Atmospheric temperature, Periodic variations), (*Atmospheric sounding, Atmospheric temperature), Sounding rockets, Meteorological parameters, New Mexico, Statistical analysis, Meteorology.

In this study the time variation of temperature between the altitudes of 30 and 60 kilometers was investigated over White Sands Missile Range, New Mexico. The approach used was a statistical technique in which all available rocketsonde information gathered at this particular site between January 1963 and May 1964 was employed. Each sounding was first tested for consistency of data, and temperatures were determined for each five kilometer interval from 30 to 60 kilometers. These temperatures on an individual sounding were then compared with the corresponding temperatures on a subsequent sounding. The difference in the two temperatures for each five kilometer level from a pair of soundings was the basis of the statistical method used.

AD-617 311 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Saint Louis Univ., Mo.
THE FREQUENCY OF RADAR DEPICTED PRECIPITATION ECHOES IN CENTRAL MISSOURI AND ILLINOIS.
Master's thesis,
by William E. Smurro. 1965, 98p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Meteorological radar, Radar echo areas), (*Radar echo areas, Atmospheric precipitation), (*Atmospheric precipitation, Radar echo areas), Missouri, Illinois, Weather forcasting, Statistical analysis.

A WSR-57 Radar with a wavelength of 10.4 centimeters was used to observe precipitation echoes within a 100 nautical mile radius of the Saint Louis Weather Bureau Airport Station, Saint Louis, Missouri. The observations were made hourly at all times during which precipitation echoes were occurring within the 100 nautical mile range. Interpretation of the range normalized charts shows that the mean echo distribution has a distinct monthly and seasonal variation with areas of maximum echo occurrence moving with a relationship to the seasonal variation of frontal or convective type precipitation. Areas of echo shadow are found which remain fixed in position and are not a function of meteorological parameters. There is an indication that ground clutter is causing an echo loss near the center of the scope.

AD-617 313 Div. 2/7, 1/4

Saint Louis Univ., Mo.
THE ROLE OF PRECIPITATION DRAG IN THE PREDICTION OF THUNDERSTORM SURFACE GUSTS.
Master's thesis,
by Uthai Sonchaeng. 1965, 96p
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Thunderstorms, Gusts), (*Gusts, Thunderstorms), (*Weather forecasting, All-weather aviation), (*All-weather aviation, Weather forecasting), Meteorological parameters, Thailand, Climatology, Convection, Turbulence, Atmospheric precipitation, Drag, Aeronautics.

This study has attempted to evolve a basis for improved prediction of thunderstorm surface gusts in storms in Thailand. Following a survey of the related literature in which it was shown that the role of precipitation drag in thunderstorm downdraft is an important factor in determining the strong surface wind gusts beneath the base of the storm and in its nearby vicinity. This prediction is required for aeronautical operations in an area of high frequency of thunderstorms, which is obvious from the climatology of tropical regions. The area of interest to this investigator is Thailand (Indo-China Peninsula). Because no direct and detailed thunderstorm structure in that area have been made, the thunderstorm model of the Thunderstorm Project is adopted, arguing similar nature and climatology of storms.

AD-617 417 Div. 2/7, 25/4
CFSTI Prices: HC$5.00 MF$1.00

Washington Univ., Seattle.
EVALUATION OF INFRARED EMISSION OF CLOUDS AND GROUND AS MEASURED BY WEATHER SATELLITES.
Doctoral thesis,
by Clifford Dalton Kern. 1964, 157p
Contract AF33 608 1129
Unclassified report

Descriptors: (*Infrared radiation, Meteorological phenomena), (*Meteorological phenomena, Infrared radiation), (*Meteorological satellites, Infrared spectroscopy), Clouds, Terrain, Atmosphere, Thermal radiation, Emissivity, Measurement, Geophysics.

Of prime interest are the radiation data from that portion of the infrared spectrum known as the atmospheric water-vapor window, ranging from about 8 to 12 microns. Infrared signals received by weather satellites and aircraft depend, in clear air, on surface temperature, atmospheric interference and surface emissivity. For the latter, very different data in literature are found for clouds, water, rocks, etc. In this report correct emissivity data were sought in three ways: (1) Reflectivity of polished rock samples was tested in an infrared spectrograph for 5-16 microns wavelength. Using Kirchhoff's law this method yielded emissivities for near normal incidence. (2) Using an 8-13 microns sensitive radiometer and an aggregate, called emissivity box, the emissivity of many surfaces was measured directly. (3) A summer noon time flight of Tiros over the Mediterranean and the Sahara was evaluated.

AD-617 519 Div. 2/7, 4/4
CFSTI Prices: HC$3.00 MF$0.75

Hawaii Inst. of Geophysics, Honolulu.
EXPERIMENTAL AND THEORETICAL STUDY OF TERRESTRIAL AND PLANETARY ATMOSPHERES.
Final scientific rept. for 1 Feb 62-31 Mar 65,
by Kenichi Watanabe. 15 Apr 65, 91p
Contract AF19 628 265, Proj. 8627, Task 862701
AFCRL 65-307
Unclassified report

Descriptors: (*Planetary atmospheres, Photochemistry), (*Atmosphere, Photochemistry), (*Gases, Photochemistry), (*Photochemistry, Atmosphere), Theory, Absorption spectrum, Ionization potentials, Vacuum, Ultraviolet radiation, Ammonia, Carbon dioxide, Nitrogen compounds, Oxides, Oxygen, Hydrogen.

Part I lists the title and abstract of six papers which resulted from this contract. Part II presents absorption and photoionization coefficients of NH3 in the region 580-1650 A obtained with improved resolution. Both the Hopfield helium continuum and H2 emission sources were

used. An ionization potential of 10.166 eV is proposed on the basis of Rydberg band analysis. Part III presents both coefficients of CO2 over the region 580-1670 A determined by the same methods. Photoionization efficiencies range from 60 to 95 per cent, and most bands below 900 A are preionized. The doublet ionization potential (13.786 and 13.766 eV) is confirmed. Part IV presents k and k sub i values of NO in the region 580-1100 A. Most bands are both preionized and predissociated. An absorption curve of H2, ionization potential of COS and scattering of vacuum UV radiation are briefly described in Part V. (Author)

AD-617 571 Div. 2/7, 22/B
CFSTI Prices: HC$1.00 MF$0.50

Bohan (Walter A.) Co., Park Ridge, Ill.
INVESTIGATION OF FRONTAL CLOUD PATTERNS IN THE ATMOSPHERE.
Final rept.,
by Walter A. Bohan. Nov 64, 12p
Contract Cwb10870

Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Cloud cover, Air mass analysis), (*Air mass analysis, Cloud cover), (*Weather forecasting, Air mass analysis), Meteorological satellites, Aerial photography, Clouds, Atmospheric motion, Meteorological charts, Northern Hemisphere, Climatology.

TIROS IV nephanalyses for the months of March, April, and May 1962 were examined in conjunction with six-hourly surface charts to obtain examples where TIROS photographic series passed over surface frontal zones. The geographical area covered was limited to the Northern Hemisphere and extended from Japan, across the North Pacific Ocean, the Continental United States, and the North Atlantic Ocean. A total of 216 passes over frontal zone areas were selected for presentation, to illustrate the characteristics of cloud cover patterns in frontal zones for this series. To provide information on the synoptic scale atmospheric circulation systems in the vicinity of the frontal zone areas, sectional surface and upper air charts are used. The cloud cover photographs corresponding to the nephanalyses are displayed in a mosaic format, rather than selected single photographs, to bring out, in addition to the frontal cloud cover characteristics, the synoptic scale cloud cover features in the attendant atmospheric circulations. A unique color transparency overlay format is used to present the nephanalyses and synoptic scale surface and upper air charts. (Author)

AD-617 594 Div. 2/7

Defence Research Telecommunications Establishment, Ottawa (Ontario).
ION COMPOSITION AND TEMPERATURES AT 1000 KM AS DEDUCED FROM SIMULTANEOUS OBSERVATIONS OF A VLF PLASMA RESONANCE AND TOPSIDE SOUNDING DATA FROM THE ALOUETTE 1 SATELLITE,
Revised ed.,
by R. E. Barrington, J. S. Belrose, and G. L. Nelms.
12 Jan 65, 19p

Unclassified report

Pub. in Journal of Geophysical Research v70 n7 p1647-64 Apr 1 1965
(Copies available only to DDC users.)
Revision of manuscript submitted 30 Nov 64.

Descriptors: (*Atmospheric sounding, Scientific satellites), (*Satellites(Artificial), Atmospheric sounding), Electron density, Ionosphere, Ions, Atmospheric temperature, Very low frequency, Atmospherics, Plasma physics, Resonance, Probes-(Electromagnetic), Geophysics, Radiofrequency spectroscopy.

Evidence is presented to support the hypothesis that the low frequency cutoff of a VLF noise band observed by the Alouette 1 satellite is due to a plasma resonance (the lower hybrid resonance) which defines a cutoff frequency for propagation transverse to the earth's field. If this hypothesis is accepted, the observations of this cutoff frequency by the satellite's VLF receiver, and simultaneous measurements of the electron plasma frequency by the topside sounder, can be used to determine an effective mean mass (m(eff)) for the ions in the ambient plasma. The m(eff) values, together with the scale height measured from the electron density profiles, set limits on the ion composition and temperature. The main support for the hybrid resonance hypothesis lies in the plausibility of the temperature and ion mass information that is derived using this interpretation and the agreement between this information and the results of other workers. In general, m(eff), is found to be larger during the day than at night and to increase with latitude. (Author)

AD-617 600 Div. 2/7, 8/6
CFSTI Prices: HC$4.00 MF$0.75

McGill Univ., Montreal (Quebec), Stormy Weather Group.
FACSIMILE AND AREAL INTEGRATION FOR WEATHER RADAR. VOLUME I.
Scientific rept.,
by Marcell Wein. Apr 65, 108p
Rept. nos. MW-40, SR-3, vol. 1
Contract AF19 628 2489, Proj. 6672, Task 667205
AFCRL 65-339 V1

Unclassified report

Descriptors: (*Meteorological radar, Display systems), (*Facsimile recording systems, Weather communications), (*Weather communications, Facsimile recording systems), Atmospheric precipitation, Radar echo areas, Meteorological charts, Data processing systems, Facsimile equipment.

Because of the fluctuating nature of the radar echo from randomly distributed precipitation particles, several individual echo measurements have to be averaged to provide a meaningful estimate of intensity. Photography of a chathode ray tube inevitably provides some averaging by integration on film, over the area of the writing spot. Further areal integration has been achieved by rectangular scanning of fast-processed film at a rate of a few lines per second with a spot of diameter one-half mile. The effective area of integration by first writing and then reading the pattern is one square mile. The areally-averaged signals are subsequently stepped into seven levels, a factor 10 apart in received power, and displayed on a stepped grey scale on facsimile paper. This presentation is well suited for a visual quantitative estimate of echo intensity. Slow scanning results in a low frequency signal that can be sent over a voice-quality telephone line to provide within minutes radar weather maps in grey scale at any number of remote facsimile recorders. (Author)

AD-617 631 Div. 2/7, 9/1

Pennsylvania State Univ., University Park.
Mineral Industries Experiment Station.

WIND AND TEMPERATURE PROFILES NEAR THE GROUND IN STABLE STRATIFICATION.
Scientific rept.,
by G. E. McVehil. 27 May 63, 17p Rept. no. SR-2
Contract AF19 604 6641, Proj. 8604, Task 860401
AFCRL 64-401

Unclassified report

Pub. in Quarterly Journal of the Royal Meteorological Society v90 n384 p136-46 Apr 1964 (Copies available only to DDC users).

Descriptors: (*Wind, Micrometeorology), (*Atmospheric temperature, Micrometeorology), (*Micrometeorology, Meteorological parameters), Turbulence, Boundary layer, Configuration, Nebraska, Polar regions.

Observed wind and temperature profiles from O'Neill, Nebraska and Antarctica are analysed to determine their characteristics in inversion conditions. Analyses of the similarity between wind and temperature profiles are presented. These show that the profiles are generally similar when the Richardson number is small. However, there is strong evidence in the Antarctic data for a departure from similarity and a decrease in the ratio of eddy conductivity to eddy viscosity for Richardson numbers greater than 0.08. It is shown that the log-linear wind profile fits the observations well for Richardson numbers less than about 0.14. The constant in the long-linear equation is found to have a value of approximately seven in stable air, implying a critical gradient Richardson number of 1/7. From the log-linear theory, heat flux and surface stress can be calculated given winds at two levels and the surface roughness. Predicted values are compared with observations. The agreement is good in the case of surface stress and fair for heat flux. (Author)

AD-617 688 Div. 2/7, 8/2, 6/6
CFSTI Prices: HC$1.00 MF$0.50

McGill Univ. Montreal (Quebec). Stormy Weather Group.
FACSIMILE AND AREAL INTEGRATION FOR WEATHER RADAR, VOLUME II.
Scientific rept.,
by Marcell Wein. Apr 65, 18p
Rept. nos. MW-40, SR-3, vol. 2
Contract AF19 628 2489, Proj. 6672, Task 667205
AFCRL 65-339 V2

Unclassified report

See also AD-617 600.

Descriptors: (*Meteorological radar, Display systems), (*Weather communications, Facsimile recording systems), (*Facsimile recording systems, Weather communications), Weather forecasting, Atmospheric precipitation, Radar echo areas, Electronic scanners, Radar recording cameras, Correlation techniques, Meteorological charts.

Because of the fluctuating nature of the radar echo from randomly distributed precipitation particles, several individual echo measurements have to be averaged to provide a meaningful estimate of intensity. Photography of a cathode ray tube inevitably provides some averaging by integration on film, over the area of the writing spot. Further areal integration has been achieved by rectangular scanning of fast-processed film at a rate of a few lines per second with a spot of diameter one-half mile. The effective area of integration by first writing and then reading the pattern is one square mile. The areally-averaged signals are subsequently stepped into seven levels, a factor 10 apart in received power, and displayed on a stepped grey scale on facsimile paper. This presentation is well suited for a visual quantitative estimate of echo intensity. Slow scanning results in a low frequency signal that can be sent over a voice-quality telephone line to provide within minutes radar weather maps in grey scale at any number of remot facsimile recorders. (Author)

AD-617 706 Div. 2/3, 2/5, 18/3
CFSTI Prices: HC$2.00 MF$0.50

Army Natick Labs., Mass.
SOME ENVIRONMENTAL-ASPECTS OF THE HUMAN FACTORS TROPICAL FIELD STUDIES.
Technical rept.,
by Jack V. Chambers. May 65, 32p
Rept. no. TR-ES-16
Proj. 1V025001A129

Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Tropical regions, Armed forces operations), (*Armed forces operations, Tropical regions), Panama, Logistics, Military personnel, Rainfall, Terrain, Soil mechanics, Trafficability, Human engineering, Performance(Human), Climatology, Maps, Tables.

The purpose of this study was to determine which environmental factors influence the performance (especially mobility rate) of the Quartermaster-equipped soldier in the tropics. The method was for an environmental observer to accompany troops on three types of operational exercises (reconnaissance and combat patrols and raid exercises) during both wet and dry seasons at Fort Sherman, Canal Zone. Data were recorded showing: weather, movement, terrain, surface conditions and vegetation at regular intervals. Tables are presented summarizing climatic conditions, terrain and mobility rates. Maps and route profiles show vegetation types and surface geology. The results of the reconnaissance and combat patrols are not such that they could be generalized on or explained by the environment. However, in the raid operations significant differences were found between the data for the two seasons. The slower mobility rate of the wet season is attributed to: (1) the prevalence of mud (the greatest hindrance to movement), (2) the debilitating effects of high humidity (the most significant environmental factor affecting comfort) and (3) a lower visibility than in the dry season. Other factors, significant in both seasons are: frequency of obstacles (streams, gullies and deadfalls), and dense stands of vegetation. (Author)

AD-617 726 Div. 2/7
CFSTI Prices: HC$3.00 MF$0.75

Atmospheric Research and Development Corp., Kansas City, Mo.
TROPOPAUSE PENETRATIONS BY CUMULONIMBUS CLOUDS - II.
Scientific rept.,
by Michael J. Long. Apr 65, 72p Rept. no. SR-2
Contract AF19 628 2454, Proj. 8624, Task 862401
AFCRL 65-331

Unclassified report

Descriptors: (*Tropopause, Cumulonimbus clouds), (*Cumulonimbus clouds, Tropopause), Climatology, Thunderstorms, Penetration, Atmosphere, Meteorological radar, Meteorology.

This report presents a four year climatology of penetrations of the tropopause by thunderstorm clouds

at ten locations in the United States. WSR-57 radar data for 1961 through 1964 were used to determine the vertical extent of the penetrations. Most penetrations occurred during spring and summer during the hours of normal maximum thunderstorm activity. Tropopause penetrations (more than 5,000 feet) are summarized by geographical areas, by months and on a diurnal basis. There was no relationship between penetrations and the number of thunderstorms. Three years of data from USAF radar stations abroad suggest a very small number of penetrations in the tropics and high mid-latitudes. Changes in the height and character of the tropopause near penetrations were studied in two serial sounding situations. (Author)

AD-617 747 Div. 2/7
CFSTI Prices: HC$2.00 MF$0.50

Itek Corp., Lexington, Mass.
CLOUD STUDY PROGRAM,
Final scientific rept. for Apr 61-Mar 65,
by J. Celi, A. Lanckton, R. J. Ondrejka, and D. I. Harvey.
23 Apr 65, 41p Rept. no. 65-9025-1
Contract AF19 604 8467, Proj. 6698, Task 669802
AFCRL 65-314

Unclassified report

See also AD-601 632.

Descriptors: (*Cloud cover, Measurement), (*Meteorological parameters, Meteorological satellites), (*Meteorological satellites, Photogrammetry), Aerial photography, Optical properties, Cloud height indicators.

This report covers work done over a 5-year period, and aimed at the investigation and determination of means for deriving quantitative meteorological data from orbiting satellites. The work was concentrated in two areas: (1) photogrammetric investigations involving satellite photography, and (2) methods for determining radiance data from satellite photography. The problems dealing with cloud photogrammetry and the design of a rectifier for Tiros photography are discussed. Radiometric calibration of the Tiros system and a high altitude aerial camera system are also discussed. Measurements made with these two systems are reported and compared. Recommendations for further work in these areas are presented along with suggested means of improving the accuracy. (Author)

AD-617 850 Div. 2/7, 8/6

Stanford Electronics Labs., Stanford Univ., Calif.
WHISTLER MEASUREMENTS OF THE EQUATORIAL PROFILE OF MAGNETOSPHERIC ELECTRON DENSITY,
by D. L. Carpenter. 1963, 19p
Contract AF49 638 1060, AF18 603 126
Proj. 9768
AFOSR 65-0899

Unclassified report

Pub. in Progress in Radio Science 1960-1963 v3 p76-91 1965
(Copies available only to DDC users).

Descriptors: (*Whistlers, Atmospheric sounding), (*Atmospheric sounding, Whistlers), (*Electron density, Ionosphere), (*Ionosphere, Electron density), Configuration, Electromagnetic waves, Meteorological phenomena, Geophysics.

A whistler method of deducing the equatorial profile of electron density is described. Results of several investigations are compared, and it is found that there is excellent agreement on the shape of the profile. Its average behavior in the range 2 R sub E to 5 R sub E geocentric distance is estimated to fall between about N varies R to the minus 3rd power and N varies R to the minus 4th power. Several roughly comparable estimates of numerical values are found to be within a factor of about 2. It is found that the results from whistlers are generally consistent with 5000-km values of electron density obtained by incoherent scatter measurements at the geomagnetic equator. Whistler evidence of a knee in the equatorial profile is presented. The knee is characterized by a region in which the profile drops rapidly from a relatively normal level to a level that may be depressed by a factor of 6 or more. The knee is believed to be a persistent phenomenon, which moves inward with increasing magnetic activity. Measurements made by the Lunik I and Lunik II probes are found to be consistent with whistler predictions of a knee in the equatorial profile. Some of the recently obtained results on temporal variations in magnetospheric density are discussed. (Author)

AD-617 851 Div. 2/7, 8/6

Stanford Electronics Labs., Stanford Univ., Calif.
ELECTRON DENSITY AND PATH LATITUDE DETERMINATION FROM V.L.F. EMISSIONS,
by Neil Brice. 30 Jul 64, 10p
Contract AF49 638 1060, Grant NSF G17037,
Proj. 9768
AFOSR 65-0897

Unclassified report

Pub. in Journal of Atmospheric and Terrestrial Physics v27 p1-6 1965
(Copies available only to DDC users).
See also AD-617 850.

Descriptors: (*Whistlers, Atmospheric sounding), (*Atmospheric sounding, Whistlers), (*Electron density, Ionosphere), (*Ionosphere, Electron density), Very low frequency, Electromagnetic waves, Propagation, Meteorological phenomena, Geophysics.

A new technique has been developed for determining nose frequencies and time delays at the nose frequency for propagation paths in the outer magnetosphere. The computed normalized whistler shape is plotted on a log-log scale, allowing the nose frequency and nose time delay to be found very simply by an overlay method, from measurements of time delays at any two other frequencies. The versatility and simplicity of this method make it particularly suited for use with periodic v.l.f. emissions. (Author)

AD-617 869 Div. 2/7

Norwegian Inst. of Cosmic Physics, Univ. of Oslo.
STUDIES ON THE EXCITATION OF N2 AND N2(+) BANDS IN AURORA.
Scientific rept.,
by A. Eftestol and A. Omholt. 22 May 64, 17p
Rept. no. SR-9
Contract AF61 052 680
AFCRL 65-483

Unclassified report

Pub. in Geophysica Norvegica v25 n6 p1-14 1965
(Copies available only to DDC users).

Descriptors: (*Aurorae, Band spectrum), (*Nitrogen, Excitation), Atomic energy levels, Emissivity, Analog systems, Circuits, Norway.

Some excitation mechanisms for N2 and N2(+) in aurora are discussed with emphasis on the time delays caused by

secondary mechanisms. The N2(+) First negative (0-1) band at 4278A and one of the following bands: (A) the N2(+) Meinel (4-1) band at 7037A, (B) the First positive (5-2) band at 6705A and (C) the Second positive (0-3) band at 4059A emitted from active aurora were recorded simultaneously by a filter photometer. The observations are consistent with the view that the three latter bands may in part be excited by secondary mechanisms. The time delays caused by secondary mechanisms are compared with the corresponding time delay caused by an analogue RC-circuit indicating time constants of the order of one second. (Author)

05. Behavioral and Social Sciences

AD-617 223 Div. 28/5

Florida Univ., Gainesville.
GROUP EFFECTIVENESS AS A FUNCTION OF THE GROUP'S KNOWLEDGE OF MEMBER DISSATISFACTION.
Technical rept.,
by Marvin E. Shaw and Paul Caron. 1964, 3p
Rept. no. TR-5
Contract Nonr58011, Proj. NR170 266
Unclassified report

Pub. in Psychonomic Science v2 p299-300 1965
(Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Group dynamics, Performance(Human)), Behavior, Effectiveness, Social psychology.

Thirty groups of five persons each attempted an easy task and a difficult task under either no feedback, overt dissatisfaction feedback, or covert dissatisfaction feedback conditions. In the overt conditions Ss publicly indicated their dissatisfaction with the group process, whereas in the covert condition dissatisfaction was signalled anonymously. Contrary to findings involving satisfaction, overt feedback of dissatisfaction was more valid and relatively more effective than covert feedback, althouth the latter finding was not statistically significant. The act of providing information concerning dissatisfaction appears to be psychologically different from the act of providing information about satisfaction. (Author)

AD-617 241 Div. 28/2, 28/5, 23/1

Delaware Univ., Newark.
THE LEADER'S PERCEPTION OF THE MARGINAL MEMBER,
by Robert C. Ziller. 1963, 6p
Grant AF AFOSR62 95
AFOSR 65-0709
Unclassified report

Pub. in Personnel Administration v28 n2 p6-11 Mar-Apr 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Leadership, Industrial psychology), (*Industrial psychology, Personnel management), (*Group dynamics, Leadership), Training, Performance(Human), Selection, Behavior, Industrial relations, Social psychology, Students, Instructors.

Results of the research suggest that the leaders of higher rated training teams show more concern for and encourage the development of the members whose performance is marginal. The results also suggest that the leader is most successful in working with these less effective team members if he does not perceive, categorize and condemn the less talented or less motivated members as untrainables or incorrigibles. This positive attitude may be attributed, in part, to greater cognitive complexity or to less narrowly and less rigidly defined standards of acceptance within an evaluation system or style that includes more than dichotomized rating scales such a good-bad and trainable-untrainable. Similar results to these may be expected with regard to similar groups. Thus, it is hypothesized that in any teams compelled by economic or labor conditions to accept and utilize a high percentage of job applicants, the leaders of the more production teams will be found to possess similar perceptual proclivities with regard to the less desirable employees. Similarly, it is hypothesized that in the early elementary school grades and particularly in schools with a high percentage of underprivileged children, the most successful teachers (in terms of student performance at given minimum standards of achievement by the maximum number of students) are less severe in their adjectival descriptions of the least preferred student. Under these conditions the limitation model of leadership is presumed to apply.

AD-617 261 Div. 32/8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE ROLE OF POLITICAL ORGANIZATIONS IN INDONESIA,
by Guy J. Pauker. 13 Oct 58, 26p
Rept. no. P-1514-RC
Unclassified report

Prepared for delivery at the 1958 Annual Meeting of the American Political Science Association, St. Louis, Mo., Sheraton-Jefferson Hotel, 4-6 Sep 58.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Indonesia, Political science), (*Political science, Indonesia), Sociology, Culture, History, Economics, Government(Foreign), Armed forces-(Foreign), Leadership, Communism.

The paper sketches the role of organized groups in contemporary Indonesia and assesses their likely influence on the direction of political developments in what is termed 'the world's geographically least integrated major state.' It is believed that due to the size of its population, natural resources, and strategic importance, Indonesia is likely to become an area of major importance and a potential trouble-spot.

AD-617 262 Div. 32/8
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
POLITICAL DOCTRINES AND PRACTICAL POLITICS IN SOUTHEAST ASIA.
Revised ed.,
by Guy J. Pauker. 16 Apr 62, 19p
Rept. no. P-2347-1
Unclassified report

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Descriptors: (*Political science, Southeast Asia), (*Southeast Asia, Political science), Communism, Culture, Government(Foreign), Leadership, History.

AD-617 263 Div. 32/8
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
GENERAL NASUTION'S MISSION TO MOSCOW.
Revised ed.,
by G. J. Pauker. 27 Feb 61, 18p Rept. no. P-2229
Unclassified report

Revision of manuscript submitted 20 Feb 61.

Descriptors: (*Indonesia, Political science), (*Political science, Indonesia), Foreign policy, Foreign aid, Communism, Government(Foreign), Commerce, Armed forces(Foreign), Leadership, USSR.

AD-617 264 Div. 32/8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE SINO-SOVIET CONFLICT AND THE WEST,
by Donald S. Zagoria. Jul 62, 30p
Rept. no. P-2595-1
Unclassified report

Descriptors: (*USSR, Foreign policy), (*China, Foreign policy), (*Foreign policy, United States Government), Communism, Political science, Foreign aid, Government(Foreign).

The author concludes that the falling out of our two major antagonists does not remove any of the intractable problems with which we are faced, and in some respects, complicates them. He asserts also that the Sino-Soviet dispute may be advantageous to the West only in the long run when the corrosive acids of nationalism might ultimately split the Bloc assunder.

AD-617 276 Div. 30/1, 8/1, 12/1, 25/6, 4/3, 25/4, 12/4
CFSTI Prices: HC$3.00 MF$0.75

Aerospace Technology Div., Library of Congress, Washington, D. C.
FOREIGN SCIENCE BULLETIN, 1965, VOL. 1, NO. 7.
Jul 65, 62p
TT 65-62548
Unclassified report

A Monthly Review of Selected Foreign Scientific and Technical Literature Sponsored by the Department of Defense.

Descriptors: (*Scientific research, Reviews), Periodicals, Government(Foreign), Lasers, Pumping(Electronics), Antenna radiation patterns, Space propulsion, Spacecraft, Polymers, Titanium compounds, Phosphorus compounds, Silicon compounds, Lanthanum compounds, Electromagnetic waves, Sound, Reports, Transducers, Nerve fibers, Solar eclipses, Geology, Powder metallurgy, Fluid flow.

Contents: Review of soviet research on optically pumped semiconductor lasers; A method for determining radiation patterns of slot antennas; Soviet detonation research and its significance for aerospace propulsion; Methods for studying the dynamics of space vehicles; Titanium-containing semiorganic polymers; New binary semiconductor compounds of lanthanum; New design principles in soviet launch-vehicle development; Short-wave asymptotics of diffraction of sound and electromagnetic waves by bodies of revolution; Diffusion of electromagnetic beams by a cone-shaped ionized trail; Ferrite capacitance transducers; Electrical model of a nerve fiber; Solar eclipse on the lunar surface; Status of investigations of the earth's crust by seismic methods; Soviet 49,000-FPS impact range; 1965 international powder metallurgy conference; Coordinating conference on studies of the earth's crust and upper mantle in the eastern USSR; Methodological problems in deep seismic sounding; Method of characteristics for equilibrium flow of an imperfect gas.

AD-617 282 Div. 28/1, 28/3
CFSTI Prices: HC$2.00 MF$0.50

Oklahoma State Univ., Stillwater.
THE EFFECT OF SELECTED PROPERTIES OF VISUAL PATTERNS ON OBSERVING BEHAVIOR IN THE SQUIRREL MONKEY.
Master's thesis,
by Paul T. Kemmerling. May 65, 44p Unclassified report

Descriptors: (*Visual perception, Monkeys), (*Behavior, Visual perception), (*Color vision, Psychophysiology), Vision, Colors, Geometric forms, Proprioception, Attention, Motivation, Conditioned reflex, Stimulation, Analysis of variance.

In this study an attempt was made to investigate the effects of five stimulus properties (color, size, angular variability, number of components, and three-dimensionality), on the inquisitive investigatory behavior of the squirrel monkey. The study was designed with two general pruposes in mind: (a) to identify, using a more analytic approach than has customarily been employed, some specific properties of visual patterns which are important to observing or attentional behavior and (b) to measure the attentional effects of these stimulus properties using one species of subject and one standard procedure - a practice which has rarely been followed, but which precludes the necessity of comparing results stemming from studies employing differing procedures and groups. (Author)

AD-617 288 Div. 28/2, 26/3
CFSTI Prices: HC$3.00 MF$0.75

Texas Technological Coll., Lubbock. School of Engineering.
OPTIMAL THREE-DIMENSIONAL WORK PLACE FOR THE SEATED WORKER.
Master's thesis,
by Richard H. Wyatt. May 65, 81p
Unclassified report

Descriptors: (*Human engineering, Industrial plants), (*Industrial equipment, Human engineering), Anthropometry, Performance(Human), Design, Job analysis, Engineering, Control panels, Motion, Statistical analysis, Factor analysis, Analysis of variance, Data processing systems, Graphics.

The purpose of this study was to investigate the work area for use in the performance of small, manual production or assembly jobs and to determine the best shape for this three-dimensional space based upon the variable factors that affect work performance times. This optimal shape may also be applicable in the design of system control panels, where responses require hand motion to controls located on a panel. (Author)

AD-617 291 Div. 23/2, 23/1, 23/3
CFSTI Prices: HC$4.00 MF$1.00

George Washington Univ., Washington, D. C.
A COMPARATIVE STUDY OF THE EMPLOYMENT CONDITIONS OF NURSES,
by Jack C. Bailey. Jun 65, 123p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Nurses, Labor unions), (*Hospitals, Personnel management), Bargaining, Wages, Costs, Medicine, Economics, Minnesota, Texas.

The study compares the working condtions of nurses in an area with and without collective bargaining for nurses. The geographical areas chosen for comparative analysis are Minneapolis-St. Paul, Minnesota and Dallas-Ft. Worth, Texas. In accomplishing the study, the expressions of hospital officials and nurses from each of the two areas surveyed and on a national scale were solicited and weighed accordingly. The findings indicated that most labor leaders and nurses favored collective bargaining for nurses. The majority of hospital

administrators and a substantial number of nurses opposed collective bargaining for nurses. In comparing the employment conditions of nurses from 1950 to 1964 in the two areas surveyed, the findings revealed that nurses under collective bargaining have enjoyed higher wages and better working conditions than nurses not under collective bargaining. However, findings also indicated that where nurses had recourse to collective bargaining, the cost of medical care was substantially higher in contrast to national averages and averages in the area which did not bargain collectively with nurses. (Author)

AD-617 294 Div. 28/2, 18/5, 28/5, 28/4, 26/2
CFSTI Prices: HC$6.00 MF$1.25

Washington Univ., Seattle.
THE LEADERSHIP ROLE OF MILITARY AND CIVILIAN SUPERVISORS IN A MILITARY SETTING AS PERCEIVED BY SUPERIORS AND SUBORDINATES.
Doctoral thesis,
by Charles Russell Holloman. 1965, 214p
Unclassified report

Descriptors: (*Leadership, Behavior), (*Supervisory personnel, Military organizations), (*Personnel management, Military psychology), Military personnel, Civilian personnel, Air force personnel, Officer personnel, Attitudes, Personality, Perception(Psychology), Social psychology, Statistical analysis.

The study was undertaken to determine the variation in perceptions which superiors and subordinates have of the leadership role of first-line military and civilian supervisors in an Air Force Organization. A secondary purpose of the study was to determine whether military and civilian supervisors tend to be superior-oriented or subordinate-oriented in their leadership behavior attitudes. The general hypothesis was that there are differentiated perceptions of the leadership role of the supervisor both between and within the two personnel components (superiors and subordinates) with which the supervisor must interact. Eight specific hypotheses were formulated with respect to the research objectives.

AD-617 299 Div. 32/4, 32/9

Arizona State Univ., Tempe. Coll. of Business Administration.
AN ECONOMIC ANALYSIS OF RETIRED MILITARY OFFICERS IN METROPOLITAN PHOENIX.
Master's thesis,
by Edwin P. Anderson, Jr. Jun 65, 150p
Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Economics, Military personnel), (*Military personnel, Economics), Officer personnel, Sociology, Statistical data, Wages, Consumption, Population, Sampling, Urban areas, Tables, Statistical analysis, Arizona.

The general conclusion of the study is that recently-retired military officers and their households are economically important to metropolitan Phoenix. Specific conclusions are: (1) The recently-retired military households have a greater overall impact on the real estate, automotive, and major appliances markets than on the minor consumer goods markets in the Phoenix area. (2) Retired military officers and their households choose to locate in the Phoenix area primarily because they find the climate to their liking. (3) Given no employment opportunities, most of the recently-retired officers would leave the Phoenix area to seek work elsewhere. (4) Given the opportunity for suitable part-time work, most recently-retired officers would remain in the Phoenix area. (Author)

AD-617 315 Div. 32/3
CFSTI Prices: HC$1.00 MF$0.50

Office of Naval Research, Washington, D. C.
THE YEAR IN NAVY SCIENTIFIC AND TECHNICAL INFORMATION,
by Charles De Vore. 1965, 10p
Unclassified report

Descriptors: (*Documentation, Naval research), (*Naval research, Libraries), (*Libraries, Naval research), Information retrieval, Reports, Subject indexing.

AD-617 316 Div. 28/4, 23/1
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Civilian Personnel (AF) Washington, D. C. Personnel Research Branch.
DEVELOPMENT OF ENGLISH LANGUAGE TEST - BASIC.
Final rept.,
by William B. Camm. 1 Jul 65, 28p Rept. no. RR-65-2
Unclassified report

Descriptors: (*Language, Test construction(Psychology)), (*Test construction(Psychology), Language), Air force personnel, Performance tests, Vocabulary, Personnel management, Perception(Psychology), Reading, Speech, Effectiveness, Social communication.

The experimental form of the ELT-Basic was administered to a randomly selected population of 671 non-U. S. citizen Air Force employees in 15 separate geographic areas and 19 language groups. Results showed that the experimental test was relatively easy and discriminating for the overall sample population. In general, the results indicated that the eight forms of the ELT-Basic possessed good utility and was predictive of levels of English language skills of listening, speaking, reading and writing as well as overall effectiveness of English language communication on the job.

AD-617 334 Div. 23/1
CFSTI Prices: HC$1.00 MF$0.50

Personnel Research Lab. (6570th), Aerospace Medical Div., Lackland AFB, Tex.
EVALUATION OF OFFICER JOBS VERSUS EVALUATION OF SPECIALTIES,
by Joe T. Hazel and Joseph M. Madden. Mar 65, 17p Rept. no. PRL TR-65-7
Proj. 7734, Task 773402
Unclassified report

Descriptors: (*Job analysis, Air Force personnel), (*Air Force personnel, Job analysis), (*Officer personnel, Job analysis), Personnel management, Wages, Classification, Specifications, Correlation techniques.

Evaluation data on 30 officer specialties were gathered from 2 groups of raters for comparison with results previously obtained when jobs were evaluated. With the same 20 factors used previously, 88 officers evaluated the specialties on a point scale against a criterion of merited pay, and another 86 against a criterion of merited grade. In addition, each officer rank-ordered the 30 specialties in terms of the criterion for his group. Correlation matrices were computed based on the mean factor ratings and mean rank-orders of specialties. Differences

in evaluation results were as follows: (1) A comparison of matrices based on jobs and specialties revealed there were more negative intercorrelations among factors when ratings were made on specialties (32%), than when jobs were rated (9%). (2) For 15 factors, tests of the differences between validity coefficients on the 4 criteria (merited pay and grade of jobs and merited pay and grade of specialties) indicated the 4 values were not all estimates of the same population value. (3) From multiple regression analyses to predict rank-order from factor ratings, more factors were found which had non-zero weights on job-based criteria than on specialty-based criteria. Because of certain advantages with jobs, and the heterogeneity of pay and grade levels within specialties, jobs seem to be the preferable units to use in a point system of evaluation. (Author)

AD-617 335 Div. 23/1
CFSTI Prices: HC$2.00 MF$0.50

Service Bureau Corp., San Antonio, Tex.
PERFORMANCE ON AIRMAN QUALIFYING EXAMINATION BY REGIONAL AREAS AND BY SEX,
by William B. Lecznar. Apr 65, 28p
Contract AF41 609 2269, Proj. 7719, Task 771906
PRL TR-65-8
Unclassified report

Descriptors: (*Air force personnel, Selection), (*Aptitude tests, Air force personnel), Recruiting, Males, Females, Performance(Human), Sex, Correlation techniques, Tables.

To provide an aptitude description of the recent airman recruiting population, score distributions on the Airman Qualifying Examination were collected for the population tested from January-September 1962 on AQE-F, and from October 1962-December 1963 on AQE-62. AQE-F samples were male enlistees from each of the 10 regional areas, a female sample, and a recruiting sample drawn randomly from nonenlistees and recruits. The AQE-62 samples included 2 samples of male recruiting examinees and 2 of women. The AQE-F data provided regional comparisons that supported previous findings of differences in mean aptitude indexes. The sex findings showed that the male recruits averaged higher on mechanical and electronics tests than the women. The recruiting population of AQE-62 averaged higher than the AQE-F recruiting sample on all aptitude indexes, indicating that the high school testing program of the USAF Recruiting Service is having a favorable impact on the quality of Air Force enlistees. (Author)

AD-617 350 Div. 32/4

Chicago Univ., Ill.
COMMODITY FLOWS IN INDIA.
Annual summary rept. no. 1 and Semi-annual status rept. no. 2,
by Brian J. L. Berry. 15 Jun 65, 15p
Contract Nonr212127, Proj. NR389 139
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Economics, India), (*India, Economics), Distribution(Economics), Transportation, Commerce, Urban areas, Rural areas, Statistical analysis, Data processing systems.

The objectives of a study of Indian Commodity Flows are reviewed, and work completed during the first year is outlined, under the following categories: (1) use of commodity flow data to determine the functional organization of the Indian economy; (2) complementary study of regional specialization in India; and (3) modes of analysis used. (Author)

AD-617 367 Div. 32/9, 18/7, 32/8
CFSTI Prices: HC$4.00 MF$1.00

Naval Ordnance Test Station, China Lake, Calif.
UNCONVENTIONAL WARFARE AND THE VIETNAMESE SOCIETY.
Rept. for May 62-Jun 63,
by John L. Sorenson, David K. Pack, Doyle W. Buckwalter, Thomas S. Carlson, and W. Craig Jones. Jul 64, 133p
Rept. no. NOTS-TP-3457
Unclassified report

Descriptors: (*Vietnam, Sociology), (*Unconventional warfare, Vietnam), Political science, Government-(Foreign), Leadership, Economics, Industries, Agriculture, Culture, Attitudes, Armed forces(Foreign), Enemy personnel.

The report has three purposes: (1) to present concisely information on the society of Vietnam in such a manner as to assist each American involved to fill out the picture of his own personal operational situation; (2) to project the current social, political, and economic situation in Vietnam, thus providing a pattern for future planning projections; and (3) to outline a systematic method for the improvement of American data capabilities on Vietnam by providing a scheme into which additional information gained by operational personnel can be meaningfully integrated. The first chapters of this report discuss Vietnamese society as it currently exists. Included are chapters on each of four basic aspects of Vietnamese society: the political, the military, the economic, and the attitude-forming. A chapter on cultural factors that influence the situation, together with a brief discussion of the society as an integrated whole, is also included in the first part of the report. A description is provided of Vietnamese society as it is projected to be 3 years in the future. A framework is also presented to guide persons in the field in assembling such additional data as may be required to fill out the details for a particular area of the society.

AD-617 377 Div. 32/2, 32/11

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE ENGLISH WORD SPECULUM. VOLUME I. THE RANDOM WORD LIST,
comp. by J. L. Dolby and H. L. Resnikoff. 1964, 380p
Unclassified report

For announcement only. Inquiries for availability are to be addressed to Technical Information Center, Lockheed Missiles and Space Co., 3251 Hanover Street, Palo Alto, Calif.

Descriptors: (*Language, Analysis), Dictionaries, Classification.

The English Word Speculum is a series of volumes illustrating the structural properties of written English words. The collection is intended to be used as a complement to the standard dictionaries of English words, and should be of particular value to linguists and students of English. The word list used to generate the volumes consists of left-justified, bold-face words contained in the Shorter Oxford English Dictionary, a total of 73,582 words. Information about the parts of speech and status of the words in the list has been drawn from both the Shorter Oxford English Dictionary and the Merriam Webster New International Dictionary, Third Edition. The first volume of The English Word Speculum consists of the entire word list arranged in random order. The random

ordering used was obtained by replacing the sequence numbers in the original word list by a sequence of binary random numbers generated by the Rotenberg routine, sorting the entire list on the field containing the binary random numbers, and then replacing the binary numbers with ordinary sequence numbers running from 00001 to 73,582.

AD-617 378 Div. 32/2, 32/11

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE ENGLISH WORD SPECULUM. VOLUME II. THE FORWARD WORD LIST,
comp. by J. L. Dolby and H. L. Resnikoff. 1964, 352p

Unclassified report

For announcement only. Inquiries for availability are to be addressed to Technical Information Center, Lockheed Missiles and Space Co., 3251 Hanover Street, Palo Alto, Calif.
See also AD-617 377.

Descriptors: (*Language, Analysis), Dictionaries, Classification.

The Forward Word List consists of the 66,439 'regular' words that occur in the Shorter Oxford. The list is grouped, first, according to the entry in the vowel-string-count column. Thus, the first set of words, coded A, is a collection of all regular words from the Shorter Oxford that contain an apostrophe in the word field. These are followed by the broken (B) words, the hyphenated (H) words, and then all words having a numberical value in the vowel-string-count column. Within each set, the words are further arranged alphabetically. This arrangement was achieved by a standard sorting routine on a digital computer. It differs substantially from the lexographic ordering of a dictionary that is also termed alphabetic.

AD-617 379 Div. 32/2, 32/11

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE ENGLISH WORK SPECULUM. VOLUME III. THE REVERSE WORD LIST,
comp. by J. L. Dolby and H. L. Resnikoff.
1964, 352p

Unclassified report

For announcement only. Inquiries for availability are to be addressed to Technical Information Center, Lockheed Missiles and Space Co., 3251 Hanover Street, Palo Alto, Calif. See also AD-617 378.

Descriptors: (*Language, Analysis), Dictionaries, Classification.

The English Word Speculum is a series of volumes illustrating the structural properties of written English words. The collection is intended to be used as a complement to the standard dictionaries of English words, and should be of particular value to linguists and students of English. The word list used to generate the volumes consists of left-justified, bold-face words contained in the Shorter Oxford English Dictionary, a total of 73,582 words. Information about the parts of speech and status of the words in the list has been drawn from both the Shorter Oxford English Dictionary and the Merriam Webster New International Dictionary, Third Edition. The list in this volume is identical to that in Volume II in that it was obtained from the same source--the regular words of the Shorter Oxford-- and was first sorted according to the number of vowel strings. The secondary ordering, however, is on the second field, the reverse word field. The objective in obtaining this list was to permit the study of groups of words that have similar endings. In this volume, all words of the same vowel-string length having the same suffix are found together.

AD-617 380 Div. 32/2, 32/11

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE ENGLISH WORD SPECULUM. VOLUME IV. THE DOUBLE-STANDARD WORD LIST,
comp. by J. L. Dolby and H. L. Resnikoff.
1964, 375p

Unclassified report

For announcement only. Inquiries for availability are to be addressed to Technical Information Center, Lockheed and Missiles and Space Co., 3251 Hanover Street, Palo Alto, Calif.
See also AD-617 379.

Descriptors: (*Language, Analysis), Dictionaries, Classification.

The English Word Speculum is a series of volumes illustrating the structural properties of written English words. The collection is intended to be used as a complement to the standard dictionaries of English words, and should be of particular value to linguists and students of English. The word list used to generate the volumes consists of left-justified, bold-face words contained in the Shorter Oxford English Dictionary, a total of 73,582 words. Information about the parts of speech and status of the words in the list has been drawn from both the Shorter Oxford English Dictionary and the Merriam Webster New International Dictionary, Third Edition. This volume is a repeat of Volumes II and III except that the word list has been further reduced to the 34,307 words that have standard meanings in both the Shorter Oxford and Webster's Third. The first half of this volume was produced by taking from Volume II all words that had a B in the status column; the second half was obtained by taking from Volume III all words with a B in the status column. The utility of Volume IV is twofold. Because of its reduced bulk, both the forward and the reverse listings are included in a single volume. Also, almost every algorithm that words reasonably well for the entire word list works measurably better on the double-standard words.

AD-617 381 Div. 32/2, 32/11

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THE ENGLISH WORD SPECULUM. VOLUME V. THE REVERSE PART-OF-SPEECH WORD LIST,
comp. by J. L. Dolby and H. L. Resnikoff.
1964, 352p

Unclassified report

For announcement only. Inquiries for availability are to be addressed to Technical Information Center, Lockheed Missiles and Space Co., 3251 Hanover Street, Palo Alto, Calif.
See also AD-617 380.

Descriptors: (*Language, Analysis), Dictionaries, Classification.

The English Word Speculum is a series of volumes illustrating the structural properties of written English words. The collection is intended to be used as a complement to the standard dictionaries of English words, and should be of particular value to linguists and students of English. The word list used to generate the volumes consists of left-justified, bold-face words contained in the Shorter Oxford English Dictionary, a total of 73,582 words. Information about the parts of speech and status of the words in the list has been drawn from both the Shorter Oxford English Dictionary and the Merriam Webster New

International Dictionary, Third Edition. Volume V is constructed by reordering Volume III, the reverse word list. The primary ordering is according to the symbol in the vowel-string-count column. A new secondary ordering is introduced by sorting the records on the merged part-of-speech field alphabetically. Within this category, the list is further sorted according to the reverse word listing. The largest single set of words with the same part of speech and status is, of course, the standard nouns. Among the 22,000-odd two-vowel-string words, nearly 7,500 are nouns and have the standard designation as such in at least one of the two dictionary sources.

AD-617 394 Div. 28/5, 28/4, 32/9
CFSTI Prices: HC$2.00 MF$0.50

Institute for Social Research, Univ. of Michigan, Ann Arbor.
THE LEARNING OF INFLUENCE STRUCTURES.
Technical rept.,
by David van Kreveld and Robert B. Zajonc.
15 May 65, 33p Rept. no. TR-32
Contract NONR122434, Proj. NR170 309
Unclassified report

Descriptors: (*Group dynamics, Psychometrics), (*Psychometrics, Group dynamics), (*Learning, Attitudes), Social psychology, Work association, Sociometrics.

Two experiments in which subjects learned hypothetical influence structures were conducted to examine cognitive biases in the representation of influence relationships. In Experiment I it was found that the degree of hierarchization of the structures does not affect learning, and hence is not a source of bias. However, hierarchial positions with greater influence were easier to learn. These position effects could not be attributed to the abstract structural properties of the learning task: in another group of subjects who learned structurally identical lists of nonsense syllables, no such effects were obtained. Experiment II confirmed the general relationship between the influence of a position and the ease of learning, except for positions having no influence at all, which were the easiest to learn. In addition, greater hierarchical distances were found to be easier to learn. The findings were interpreted in terms of more fundamental cognitive biases, such as transitivity and irreciprocity. (Author)

AD-617 416 Div. 23/1, 13/6
CFSTI Prices: HC$4.00 MF$1.00

Iowa State Univ., Iowa City.
DEVELOPING AN EFFECTIVE MANAGEMENT TOOL FOR THE INTERNAL DISTRIBUTION OF MANPOWER RESOURCES IN A THOUSAND-BED UNITED STATES AIR FORCE HOSPITAL.
Master's thesis,
by Jerry L. Moore. Jun 65, 144p
Contract AF33 608 1072
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Hospitals, Personnel management), (*Air Force, Hospitals), (*Medical personnel, Standards), Manpower studies, Military medicine, Nurses.

A study was made to determine an effective means of distributing personnel on the basis of workload. The study was of a statistical nature, examining relationships between many variables and developing standards based upon these relationships. The primary measure of workload was a device currently in use by the Air Force Medical Service known as the Composite Weighted Work Unit. This mechanism applies weighted values to four factors accounting for patient care workload -- occupied beds, admissions, births, and outpatient visits -- and treats the combined result as a composite measure of workload. This study tested the Composite Weighted Work Unit's adaptability for internal use within a large hospital in measuring departmental workloads against an overall hospital workload, thereby providing a basis for reviewing the distribution of manpower resources. Indications are that a composite weighted work unit, carefully developed and judiciously applied, can be a valuable management tool in the administration of a large and complex hospital organization. (Extracted)

AD-617 418 Div. 28/1
CFSTI Prices: HC$2.00 MF$0.50

Yale Univ., New Haven, Conn.
STUDIES IN FORCED COMPLIANCE I: THE EFFECT OF PRESSURE FOR COMPLIANCE ON ATTITUDE CHANGE PRODUCED BY FACE-TO-FACE ROLE PLAYING AND ANONYMOUS ESSAY WRITING.
Technical rept.,
by J. Merrill Carlsmith, Barry E. Collins, and Robert L. Helmreich. Jul 65, 41p Rept. no. TR-1
Contract Nonr462900; Grant NSF GS492,
Proj. NR171 246
Unclassified report

Descriptors: (*Attitudes, Psychometrics), Students, Males, Females, Motivation, Performance(Human), Theory.

One half of the experimental subjects (male high school students) were enticed to tell the next subject (a female accomplice) that the experimental task was interesting, exciting, fun, and enjoyable (when, in fact, it was quite dull). The other half of the experimental subjects wrote an anonymous essay to the same effect. Experimental subjects were paid an additional $.50, $1.50, or $5.00 for this counter-attitudinal response. Control subjects merely worked on the experimental task and completed the posttest. The data from the face-to-face condition replicates the original Festinger and Carlsmith experiment; small amounts of money were most effective in convincing Ss that the task was really fun and interesting. Data from the essay condition, however, indicated just the opposite. Large amounts of money produce the most attitude change. (Author)

AD-617 460 Div. 32/3

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
IMPLICATIONS OF MECHANICAL TRANSLATION RESEARCH,
by Victor H. Yngve. 1964, 7p
Unclassified report

Pub. in Proceedings of the American Philosophical Society v108 n4 p275-81 Aug 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Machine translation, Reviews), (*Language, Machine translation), Cybernetics, Computers.

AD-617 514 Div. 28/5

Wilford Hall Hospital (Air Force), Lackland AFB, Tex.
MILITARY RETIREMENT: SOME BASIC OBSERVATIONS AND CONCEPTS,

by John S. McNeil and Martin B. Giffen.
1965, 5p
Proj. 7756
AMLC TR-65-1 Unclassified report
Pub. in Aerospace Medicine v36 n1 p25-9 Jan 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Military personnel, Adjustment(Psychology)), Sociology, Social psychology, Officer personnel, Military psychology, Anxiety, Emotions, Therapy.

Prior to World War II military retirement posed little or no problem since relatively few were on retired roles. However, with the increase in military strength and the number of retirements, many problems have arisen which were not previously noted by either the personnel people or medical personnel. Some of the problems and confusion which arises when individuals are faced with retirement are presented in this article. Early assistance by many different specialities can be of invaluable aid to the prospective retiree. Support and assistance in developing a realistic pre-retirement program will help channel the individual's anxiety and energy in a constructive direction. Success at this stage can help the individual retire to another career or interest and not simply see himself as 'put to pasture.' During the period of role confusion, the retiree needs help in redefining his identity and re-establishing a role for himself. Most retirees successfully negotiate the role confusion phase without professional intervention, but expert help at this time would serve to reduce the amount of emotional trauma and turmoil. Therapy oriented toward social functioning will prove beneficial to most. Assistance in this critical phase of a career is in the field of mental health. Once the individual has become maladjusted to and with his retirement, more prolonged and intensive treatment is required. (Author)

AD-617 525 Div. 28/1
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J.
ANALYSIS OF MEMORY FOR CHANGING INFORMATION.
Final rept. for 19 Mar 64-30 Jun 65,
by Sam Glucksberg. 1 Jul 65, 13p
Contract DA31 124AROD199, Proj. DA1J12001B024
AROD 5038:2
Unclassified report

Descriptors: (*Memory, Analysis), (*Learning, Performance tests), Retention, Performance(Human), Time, Interference.

Three series of experiments were performed. The first two concerned the interplay of a limited set of variables in sequential memory tasks which involved keeping track of changing information. The third focussed upon the examination of interference effects in very short-term memory (VTM).

AD-617 546 Div. 28/3, 16/1, 23/5
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
1964 SUPPLEMENT TO A BIBLIOGRAPHY OF REPORTS ISSUED BY THE BEHAVIORAL SCIENCE LABORATORY: ENGINEERING PSYCHOLOGY, TRAINING PSYCHOLOGY, ENVIRONMENTAL STRESS, SIMULATION TECHNIQUES, AND PHYSICAL ANTHROPOLOGY,
comp. by Lavon E. Trygg. 1 Jan 65, 16p
Unclassified report

Descriptors: (*Psychophysiology, Space medicine), (*Human engineering, Space medicine), (*Space medicine, Bibliographies), Attention, Training, Astronauts, Training devices, Stress(Physiology), Vision, Adaptation(Physiology), Auditory preception, Simulation, Speech, Tracking, Learning, Target recognition, Anthropometry, Mathematical models, Performance(Human).

AD-617 547 Div. 32/9
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
WHAT IS THE 'SOCIAL RESPONSIBILITY' PROBLEM,
by F. J. Gruenberger. Jul 65, 9p
Rept. no. P-3163
Unclassified report

Descriptors: (*Automation, Sociology), Labor, Economics, Population.

AD-617 548 Div. 32/4
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
NATIONAL PRIORITIES AND DEVELOPMENT STRATEGIES IN SOUTHEAST ASIA,
by Charles Wolf, Jr. Jun 65, 19p
Rept. no. P-3035-1
Unclassified report

Prepared for presentation for the Association for Asian Studies-University of Hawaii Conference on Economic planning in Southeast Asia, Honolulu, 1-5 Feb 65.

Descriptors: (*Economics, Southeast Asia), (*Southeast Asia, Economics), Industrial production, Agriculture, Transportation, Electricity, Commerce, Banking, Housing, Money, Costs, Effectiveness Government(Foreign), Political science, Statistical analysis.

Development strategies of the Southeast Asian countries, as reflected by the allocative pattern or emphasis that has characterized the path of development during the 1955-1962 period, are ddiscussed. Three categories of allocation that are prominent in development literature and in policy discussions are considered: namely, allocations (a) among sectors; (b) between public and private activities; and (c) to trade, more particularly to the growth of exports.

AD-617 556 Div. 23/4, 15/2
CFSTI Prices: HC$3.00 MF$0.75

Pittsburgh Univ., Pa.
A MARKOVIAN ANALYSIS OF PUPIL PROGRESS THROUGH A SYSTEM OF INDIVIDUALIZED INSTRUCTION.
Master's thesis,
by James Gordon Weatherson. 1965, 85p
Contract AF33 608 1104
Unclassified report

Descriptors: (*Education, Statistical analysis), (*Statistical analysis, Education), Probability, Statistical processes, Mathematical models, Reading, Mathematics, Students.

An analysis is given of pupil progress through an ungraded curriculum for the purpose of providing statistical information to the administrators and teachers of the curriculum.

AD-617 559 Div. 28/2, 18/3
CFSTI Prices: HC$1.00 MF$0.50

Human Engineering Labs., Aberdeen Proving Ground, Md.
HUMAN FACTORS ENGINEERING REQUIREMENTS FOR THE DEVELOPMENT OF U. S. ARMY MATERIEL,
by Robert F. Chaillet. Jan 65, 18p
Rept. no. HEL Standard S-4-65
Unclassified report

Descriptors: (*Human engineering, Military requirements), (*Army equipment, Human engineering), Management control systems, Systems engineering, Logistics, Maintenance, Army training, Training devices, Performance(Human).

The objective of the human factors engineering (HFE) program is to assure that the principles procedures and criteria of HFE are applied during all phases of system research, development, test, and evaluation (RDT and E). The objective requires the integration and application of HFE to equipment and facilities design, operational and maintenance requirements, task and skill requirements, training, training devices and job aids. The purpose of the standard is twofold: (a) To define the human factors engineering requirements applicable when contractors respond to AMC Requests for Proposals (RFP).; and (b) To define the human factors engineering requirements applicable during system research, development, test and evaluation.

AD-617 598 Div. 23/5
CFSTI Prices: HC$2.00 MF$0.50

Bell Aerosystems Co., Buffalo, N. Y.
INTRA-CREW COMMUNICATION OF B-52 AND KC-135 STUDENT AND COMBAT CREWS DURING SELECTED MISSION SEGMENTS.
Final rept. for May 63-Jan 64,
by Maurice Siskel, Jr., Francis D. Lane, William E. Powe, and Ralph E. Flexman. May 65, 30p
Contract AF33 616 7681, Proj. 1710, Task 171003
AMRL TR-65-18
Unclassified report

Descriptors: (*Aviation personnel, Intercommunication systems), (*Air force personnel, Training), Aircraft, Students, Selection, Effectiveness.

An experiment was carried out to compare within-crew communications in B-52 and KC-135 aircraft during peacetime training flights as functions of crew experience and selected mission segments. Crew transmission and message rates were obtained from tape recordings of crew communications on the aircraft interphone system during takeoffs and bomb runs in the bomber and takeoffs and air refuelings in the tanker. In each case, samples were obtained from student crew solo missions and from the combat crew training missions. On the basis of earlier work, it was hypothesized that as a result of their lower level of coordination, the less experienced student crews would have a higher rate of communication than the more experienced combat crews. In two of the comparisons, this hypothesis was confirmed while in two others it was not. Because none of the differences were statistically significant, the results were discussed in terms of the trends which were indicated and several unavoidable compromises in experimental control. (Author)

AD-617 607 Div. 23/4, 24/2, 24/1
CFSTI Prices: HC$1.00 MF$0.50

Gralex, Inc., Rochester, N. Y.
FILMSTRIP TECHNIQUES FOR INDIVIDUALIZED INSTRUCTION.
Final rept. for May 63-Mar 64,
by William H. Trow and Edgar A. Smith.
May 65, 21p
Contract AF33 657 11339, Proj. 1710, Task 171007
AMRL TR-65-78
Unclassified report

Descriptors: (*Training devices, Photographic film), (*Photographic film, Training devices), Education, Photographs, Training films, Still projectors, Camera components + accessories, Costs, Teaching machines, Color film, Specifications.

In the preparation of filmed programed instruction, several considerations are involved in the choice between slides and filmstrips. In this report, the considerations of revision, quantity, length, storage, recycling, aspect ratio, change time, random access and continuous repetition are briefly discussed. A comparison of costs of preparing a master of the filmed program and duplicate copies is made. As a guide to the preparation of filmstrips by staff photographers, some of the problems involved are discussed, namely, single-frame cameras, the preparation of flat copy, exposure and splicing. Other film formats with possible application in audio-visual programing are described. (Author)

AD-617 608 Div. 23/4, 24/2, 5/3
CFSTI Prices: HC$2.00 MF$0.50

Gralex, Inc., Rochester, N. Y.
AN EXAMINATION OF THE FEASIBILITY OF MODULAR DESIGN FOR AUDIOVISUAL AUTO-INSTRUCTIONAL EQUIPMENT.
Final rept. for May 63-Mar 64,
by William H. Trow and Edgar A. Smith.
May 65, 36p
Contract AF33 657 11339, Proj. 1710, Task 171007
AMRL TR-65-79 Unclassified report

Descriptors: (*Training devices, Photographic recording systems), (*Photographic recording systems, Training devices), Education, Photographs, Photographic film, Training films, Still projectors, Disk recording systems, Magnetic recording systems, Teaching machines, Costs, Feasibility studies.

The increasing need for audiovisual autoinstructional equipment in a wide range of applications has created a major problem in development of satisfactory equipment to meet the varying demands. Each specific situation requires a certain combination of optical, mechanical and electronic functions which cannot necessarily be adapted to subsequent usages of the equipment. This results either in the costly acquisition of many similar pieces of equipment or in undesirable restrictions on the instructional techniques that might be used. This study examines existing and potential areas of application for audiovisual autoinstructional equipment and proposes a modular approach in the development of new equipment. Each module would embody a separable major function and would be interchangeable in the system. The proposed basic modules would include: (1) a slide-changer module, (2) a filmstrip module, (3) a family of screen modules, (4) a family of light source modules, (5) an audio record and playback module, (6) three signal pulsing modules, (7) a multiplechoice response module, and (8) a write-in response module. Many of these would allow operational alternatives or modification for specialized applications for maximum versatility. (Author)

AD-617 609 Div. 23/4, 24/2
CFSTI Prices: HC$2.00 MF$0.50

Gralex, Inc., Rochester, N. Y.

DESIGN CONSIDERATIONS INFLUENCING THE SIZE AND COST OF OPTICAL COMPONENTS IN AUTO-INSTRUCTIONAL DEVICES.
Final rept. for May 63-Mar 64,
by William H. Trow and Edgar A. Smith. May 65, 41p
Contract AF33 657 11339, Proj. 1710, Task 171007
AMRL TR-65-80

Unclassified report

Descriptors: (*Training devices, Photographic equipment), (*Photographic equipment, Training devices), Photographic projectors, Still projectors, Design, Costs, Viewing screens, Brightness, Luminescence, Photographic recording systems, Optical materials, Teaching machines, Mathematical analysis.

The increasing demand for low-priced projectors for self-instructional purposes has prompted investigation of design factors which contribute to the manufacturing costs in this class of product. Because cost and intended use are prime factors, design must be cased upon the optimum combination of optical components which satisfies these design objectives. The problems of the projector design itself are considered, primarily the design considerations for optical components that might be used. Recent developments in lens and reflector fabrication methods do not yet permit a reduction of cost below that of conventional methods and designs. Some principles and practices for rear projection are presented, and the interdependence of major factors involved in maximizing screen performance is expressed in mathematical terms. The environmental factors of room illumination level, audience size and the contrast of the filmed material are found to be highly influential in the design of a rear-projection device. (Author)

AD-617 615 Div. 23/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

Space and Information Systems Div., North American Aviation, Inc., Downey, Calif.
FEASIBILITY STUDY OF PERSONNEL IDENTIFICATION BY SIGNATURE VERIFICATION.
Final rept. for 15 Jul-19 Dec 64,
by A. J. Mauceri. Apr 65, 92p Rept. no. SID-65-24
Contract AF30 602 3493, Proj. 8501, Task 850101
RADC TR-65-33

Unclassified report

Descriptors: (*Personnel, Identification), (*Pattern recognition, Feasibility studies), Monitors, Office equipment + supplies, Statistical analysis, Acceleration, Psychometrics, Paper, Accelerometers, Magnetic recording systems, Signals, Analog computers, Analog-to-digital converters, Analysis, Communication equipment.

The study consists of the acquisition of signature samples from test subjects utilizing an instrumented writing device. The signature samples are then analyzed statistically for relatively invariant indices used to establish identity. When these identity patterns are established, the system is capable of differentiating automatically, with a high degree of accuracy, between two or more subjects. The instrumentation of the writing device, establishment of indices, and the analysis program represent the major primary development areas. (Author)

AD-617 633 Div. 16/12

Siena Univ. (Italy).
REFLEX REGULATION OF CONSCIOUSNESS AND EMOTIONAL BEHAVIOUR,
by M. Guazzi, A. Malliani, and A. Zanchetti. 1964, 18p
Contract AF61 052 253, Proj. 9777, Task 977701
AFOSR 65-0954

Unclassified report

Pub. in Acta Neurochirurgica v12 pt2 p198-214 1964 (Copies available only to DDC users).

Descriptors: (*Reflexes, Central nervous system), (*Central nervous system, Behavior), (*Behavior, Central nervous system), Brain, Stimulation, Cerebral cortex, Electroencephalography, Sleep, Chemoreceptors, Inhibition, Emotions, Italy.

The afferent modulation of the central nervous mechanisms regulating conscious behavior is discussed and compared to the effects of afferent and brain stem stimulation on the emotional behavior of diencephalic origin. The electroencephalographic synchronization and sleep induced by stimulating the carotid sinus baroceptors in encephale isole or intact animals is paralleled by the inhibition of the spontaneous sham rage outburst of the decorticate cat by natural baroceptive stimulation; on the other hand, the carotid body chemoceptors do not only exert an arousing action, but are also capable of precipitating sham rage fits in the decorticate cat. As in encephale isole or intact animals suitably timed reticular stimuli may induce either desynchronization and arousal, or synchronization and sleep, likewise rage fits may either be evoked or inhibited by electrical stimulation within the reticular formation. Finally, the rage behavior of the decorticate cat depends, like cortical desynchronization and wakefulness in intact animals, upon a tonic background of ascending reticular activity. It is suggested that identical, or closely related, mechanisms may affect both conscious alert behavior and several somatic and visceral activities, such as those subserving emotional behavior. (Author)

AD-617 646 Div. 28/3

Washington Univ., St. Louis, Mo. School of Medicine.
HEART RATE CONDITIONING IN THE RAT,
by Fred S. Fehr and John A. Stern. 4 Oct 64, 13p
Grant PHS MY2755

Unclassified report

Pub. in Journal of Psychosomatic Research v8 p441-53 1965 (Copies available only to DDC users).

Descriptors: (*Pulse rate, Conditioned reflex), (*Conditioned reflex, Pulse rate), Heart, Fear, Anxiety, Emotions, Stimulation, Psychophysiology, Autonomic nervous system, Analysis of variance, Rats.

Classical conditioning procedures were used to evaluate the development and extinction of conditioned HR changes in the albino rat. The data suggest that the experimental group (a) developed a generalized HR response to the apparatus, their HR remaining consistently (and on Day 4 of conditioning, significantly) above that of the control group during the 2 hr pre-conditioning period; (b) showed an anticipatory HR increase during the CS presentation which was maximum after 4 to 6 sec of CS and was then followed by increases of less magnitude until just prior to and during the UCS period (on non reinforced trials); (c) demonstrated a localized conditioned HR response immediately post-UCS (on non reinforced trials) which appeared to reflect most adequately conditioned HR changes; (d) showed signs of retention of conditioned HR responses on Day 5 and 30 of extinction. (Author)

AD-617 656 Div. 28/3, 32/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.

INCREASING THE RELIABILITY OF OBJECTIVE PERCEPTION OF VOCAL SOUNDS BY INTRODUCING A REPEATED DEMAND,
by G. I. Tsemel. 18 May 65, 7p
Rept. no. FTD-TT-65-104
TT 65-62571

Unclassified report

Unedited rough draft trans. of Problemy Peredachi Informatsii (USSR) n15 p77-9 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.

Descriptors: (*Speech recognition, Auditory perception), (*Auditory perception, Speech recognition), (*Speech, Intelligibility), Speech transmission, Speech representation, Hearing, Reliability, USSR.

The experiment showed that repeated demand leads to a substantial rise in reliability of perception on account of a certain delay (in time necessary for repeated pronounciation) in cases when the word was quite clearly said.

AD-617 659 Div. 23/5, 31/1, 18/7

Foreign Technology Div., Wright-Patterson AFB, Ohio.
RED STAR, 31 OCT. 1964 (SELECTED ARTICLES),
by O. Bar-Biryukov and P. Latun. 8 Jul 65, 10p
Rept. no. FTD-TT-65-256
TT 65-62574

Unclassified report

Unedited rough draft trans. from Krasnaya Zvezda (USSR) 31 Oct p1 1964.
Available only for reference use at DDC Field Services.
Copy is not available for public sale.

Descriptors: (*Air-sea rescues, Submarine personnel), (*Military personnel, Training), Submarines, Officer personnel, Armed forces(Foreign), Communists, USSR.

Contents: The submarine crew comes out on the surface. On the ground where heroes struggled.

AD-617 674 Div. 23/5, 3/4, 20/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PROTECTION FROM MASS-DESTRUCTION WEAPONS,
by N. Ivashentsev and V. Mesterov. 2 Jul 65,
18p Rept. no. FTD-TT-65-688
TT 65-62588

Unclassified report

Unedited rough draft trans. of Voennyi Vestnik (USSR) v44 n11 p56-61 1964.

Descriptors: (*Mass destruction weapons, Countermeasures), (*Military training, Mass destruction weapons), Nuclear warfare, Biological warfare, Chemical warfare, Radiological contamination, Protective clothing, Protective masks, Decontamination, Military personnel, USSR.

AD-617 689 Div. 23/5, 1/4, 31/5
CFSTI Prices: HC$4.00 MF$0.75

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
Research Dept.

KINETIC CUEING IN SIMULATED CARRIER APPROACHES.
Final rept. for Jun 63-Jan 65,
by Joseph N. Ruocco, Patrick A. Vitale, and Robert C. Benfari. 28 Apr 65, 107p
Contract N61339 1432, Proj. 7588
NAVTRADEVCEN 1432-1

Unclassified report

Descriptors: (*Carrier landings, Flight simulators), (*Proprioception, Flight simulators), (*Naval aviation, Training devices), (*Flight simulators, Carrier landings), Pilots, Training, Cockpits, Motion, Visual signals, Display systems, Human engineering, Aeronautics, Psychophysiology.

Pairs of matched pilots were trained using a flight simulator in a carrier-landing maneuver under two conditions--kinetic and static. The two conditions were identical except that in the kinetic mode cockpit motion was provided. Kinetic cueing significantly improved performance in terms of percentage of successful landings, altitude error, time outside the flight path, and variability of pilot inputs. The statically trained group showed a decrement in performance which persisted throughout training and transferred to the criterion flights which involved cockpit motion. Results clearly indicate that kinetic cueing is a valuable and desirable adjunct to flight airborne simulation systems. (Author)

AD-617 719 Div. 32/4
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE USES OF ECONOMICS,
by Charles J. Hitch. 17 Nov 60, 24p
Rept. no. P-2179-RC

Unclassified report

Descriptors: (*Economics, Theory), United States Government, Federal budgets, Costs, Commerce, Money.

AD-617 740 Div. 23/4
CFSTI Prices: HC$4.00 MF$0.75

United States Industries, Inc., Silver Spring, Md.
Educational Science Div.
A GUIDE TO PREPARING INTRINSICALLY PROGRAMMED INSTRUCTIONAL MATERIALS.
Final rept. for 15 Dec 59-31 Oct 63,
by R. E. Walther and Norman Crowder.
Apr 65, 106p
Contract AF33 616 6983, Proj. 1710, Task 171007
AMRL TR-65-43

Unclassified report

Descriptors: (*Education, Training devices), (*Training devices, Education), Learning, Programmers, Teaching machines, Preparation, Students, Tests, Costs.

To aid those responsible for the preparation of intrinsically programmed instructional materials, the procedures and techniques developed by the Educational Science Division of U. S. Industries, Inc., have here been organized into a practical working guide. The organization of this report closely follows the sequence of steps required to produce an effective intrinsic program. Although other systems of programming are identified, this guide is specifically intended for use in the preparation of intrinsic programs in either book or TutorFilm format. (Author)

AD-617 745 Div. 28/5, 28/1, 28/3, 28/4
CFSTI Prices: HC$2.00 MF$0.50

School of Aerospace Medicine, Brooks AFB, Tex.
COPING AND DEVELOPMENTAL THEORY: APPLICABILITY TO SELECTIVE STUDY OF NORMAL MEN.
Aeromedical Reviews,
by Paul M. Fine and Charles L. Jennings. Apr 65, 38p Review 1-65
Unclassified report

Descriptors: (*Behavior, Adjustment(Psychology)), (*Adjustment(Psychology), Behavior), (*Personality, Adjustment(Psychology)), Learning, Children, Adults, Emotions, Projective techniques, Social psychology, Military personnel, Military psychology, Psychophysiology, Psychometrics, Air force personnel, Selection.

A clinically derived psychiatric theory concerning personality development, applicable to Air Force selection of personnel for specific tasks, training, and environments, is discussed. Adult 'coping' patterns are considered in terms of a universal developmental sequence--simpler. modes of behavior which become incorporated in more complex adult derivatives. Successful adaptation is believed to depend upon personality strength as well as coping techniques. A result of a preliminary research is presented to show how coping devices may be observed, categorized, rated, and used in selection procedures.

AD-617 767 Div. 23/4
CFSTI Prices: HC$3.00 MF$0.75

Human Resources Research Office, George Washington Univ., Alexandria, Va.
FUNCTIONAL AND APPEARANCE FIDELITY OF TRAINING DEVICES FOR FIXED-PROCEDURES TASKS.
Technical rept.,
by John A. Cox, Robert O. Wood, Jr., Lynn M. Boren, and H. Walter Thorne. Jun 65, 53p
Rept. no. TR-65-4
Contract DA44 188AR02, Proj. 2J024701A712 03
Unclassified report

Descriptors: (*Training devices, Effectiveness), Simulation, Military training, Military personnel, Performance tests, Human engineering, Transfer of training, Costs.

Twelve training devices of reduced fidelity were prepared. Several five-man groups were trained using each device, and then each man was given a proficiency test. Intelligence of trainees, teaching method, and instructor effects were statistically controlled. No significant differences in proficiency or length of training time were found to be associated with the training device used, regardless of degree of functional or appearance fidelity. As a field test under more realistic Army conditions, with military instructors and soldiers chosen at random, a low fidelity device was used to train one group while another group was instructed with high fidelity equipment. A comparison of proficiency levels and training times showed only chance differences between these two groups. (Author)

AD-617 769 Div. 23/1, 28/2, 23/3, 23/4
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
A STRUCTURED APPROACH TO PERFORMANCE APPRAISAL AND SALARY ADMINISTRATION,
by George P. West. 21 Jun 65, 11p
Rept. no. SP-2130 Unclassified report

Descriptors: (*Performance(Human), Job analysis), (*Job analysis, Wages), (*Wages, Performance(Human)), Performance tests, Training, Motivation.

Conflicting requirements inherent in performance appraisals for salary administration are contrasted to performance appraisal for counseling or training of the individual. An intermediate approach is suggested which resolves these conflicts and provides worthwhile feedback to the individual, while at the same time administering salary actions consistently with performance. The process utilizes work-related goals. The supervisor works with the individuals to find challenging work assignments for all his subordinates and evaluates the work, pointing out specific areas of weakness or of unusually high quality work. Comparison is made to an imagined average or typical individual. By relating the quality of the work performed by different individuals (as measured by the common traits score), the supervisor can recommend salaries consistent with the quality of the work accomplishments of his people. (Author)

AD-617 775 Div. 23/4
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
ADJUNCT TO SELF-STUDY FOR AIRCREW REFRESHER TRAINING UNDER OPERATIONAL CONDITIONS IN THE AIR DEFENSE COMMAND.
Final rept. for Mar-Oct 64,
by Donald E. Meyer. Mar 65, 32p AMRL-TR-65-83
Proj. 1710, Task 171007 Unclassified report

Descriptors: (*Education, Training devices), (*Training devices, Education), (*Aviation personnel, Training devices), Teaching machines, Students, Learning, Tests, Air defense command.

The paper is a report of the development and experimental comparison of a self-study technique with conventional classroom methods as a means of refresher training of Air Crews under operational conditions. The self-study technique consisted of (1) a comprehensive series of multiple-choice questions covering the subject matter with each question bearing reference to the page and paragraph of a manual containing the detailed information on which the question was based, (2) a punchboard by which students immediately determined whether their answer to each question was correct or incorrect, and (3) the manual to which students referred for information when they chose an incorrect answer to a question. The conclusions are: (1) the preparation and administration of the self-study technique is entirely within the capability of an operational squadron with only a minimum of guidance; (2) in the operational setting, the self-study technique is superior to conventional classroom methods in its effectiveness as a means of refresher training; and (3) students favor the self-study method for refresher training. (Author)

AD-617 793 Div. 32/2
CFSTI Prices: HC$1.00 MF$0.50

Istituto Documentazione della Associazione Meccanica Italiana, Milan.
ENGLISH PREPOSITIONS IN MACHINE TRANSLATION.
Informal rept.,
by Jehane Burns. Jan 65, 17p
Grant AF EOAR64 54
AFOSR 65-0861
Unclassified report

Prepared for publication in Italian in Rivista di Psicologia, Milan.

Descriptors: (*Machine translation, Language), (*Language, Analysis), Computers, Classification, Italy.

AD-617 798 Div. 28/5
CFSTI Prices: HC$2.00 MF$0.50

Hawaii Univ., Honolulu.
CONCESSION-MAKING IN EXPERIMENTAL NEGOTIATIONS.
Scientific rept.,
by Otomar J. Bartos. 16 Nov 64, 45p
Grant AF AFOSR62 314, Proj. 9779, Task 977902
AFOSR 65-0729
Unclassified report

Descriptors: (*Bargaining, Social psychology), (*Social psychology, Bargaining), Behavior, Group dynamics, Sociology, Psychology, Theory, Mathematical analysis.

Two seemingly contradictory hypotheses about concession-making were considered: that concession-making occurs only as a result of own failure (experienced when opponent lowers his offers), and that it occurs only as a result of reciprocity (as a reaction to opponent's concession-making). A total of 87 five-man experiments, bearing upon these hypotheses, were conducted. The findings were somewhat unexpected in that they suggested that opponent's behavior determines a negotiator's behavior far less than one might expect: by and large, a negotiator's demands depended on his own previous demands. To the extent, however, to which opponents' behavior was influential, the 'reciprocity' hypothesis appeared to be more nearly correct than the 'failure' hypothesis. It was found, furthermore, that concession-making tended to be a rather bad strategy, that a negotiator making few concessions tended to receive higher payoff than the negotiator who made many concessions. In accounting for the findings, it was shown that the deadline could play an important role in determining the final payoff, and that, were the time alloted for negotiation much shorter, concession-making might have been a more profitable strategy that it actually was. (Author)

AD-617 833 Div. 16/12, 28/3

Walter Reed Army Inst. of Research, Washington, D. C.
CONDITIONED AVOIDANCE BEHAVIOR IN PRIMATES DURING VARIOUS EXPERIMENTAL UREMIC STATES,
by J. C. Sharp and G. P. Murphy. 1964, 8p
Unclassified report

Pub. In Nephron v1 p172-9 1964 (Copies available only to DDC users).

Descriptors: (*Behavior, Blood diseases), (*Blood diseases, Behavior), (*Primates, Behavior), Kidneys, Urea, Urine, Urinary system, Excision, Electrolytes-(Physiology), Parenteral infusions, Monkeys, Psychophysiology, Toxicity.

Primates were trained on a simple avoidance schedule and observed during three experimental uremic states: (a) continuous urine reinfusion; (b) bilateral ureteral ligation; or (c) bilateral nephrectomy. Performance decrements: occurred under (b) and (c) when plasma urea nitrogen (PUN) concentrations reached 195 mg%; occurred under (a) with PUN concentration as low as 40 mg%; but were not directly correlated with plasma potassium or sodium ion concentrations. (Author)

AD-617 860 Div. 32/7, 15/1

Illinois Univ., Urbana.
THE PROBLEM OF FORMALIZATION OF THE TRANSCENDENTAL-DIALECTIC LOGIC, WITH SPECIAL REGARD TO THE LOGIC OF HEGEL (Das Problem einer Formalisierung der Transzendental-Dialektischen Logik, unter Besonderer Beruecksichtigung der Logik Hegels),
by Gotthard Gunther. 1964, 60p
Grant AF AFOSR480 64, Proj. 9769, Task 976906
AFOSR 65-0698
Unclassified report

Text in German.
Pub. in Hegel-Studien suppl. 1 p65-123 1964 (Copies available only to DDC users).

Descriptors: (*Mathematical logic, History), Calculus of variations, Germany.

In this investigation, the problem of the formalization of transcendental-dialectic logic, which is the basis of German idealism, is considered. A direct investigation is made of the existing historical writings of authors Kant, Fichte, Hegel and Schelling in the language of a formal calculus. A new statement of the essential problem, which revealed itself in the development of the positive philosophy from Kant to Schellings on the basis of a transclassical formalism, is treated here. Questions such as what is transcendental appearance, subjectivity, introspection, and transference of thoughts are entirely independent, so that they represent the main problem of idealism, and are investigated through their formal logical structure. (Author)

AD-617 865 Div. 32/2

Istituto Documentazione della Associazione Meccanica Italiana, Milan.
A PROJECT FOR AUTOMATIC SENTENCE ANALYSIS,
by Ernst von Glasersfeld. 1964, 10p
Grant AF EOAR64 54, Proj. 9769, Task 976905
AFOSR 65-0860
Unclassified report

Pub. in Beitraege zur Sprachkunde und Informationsverarbeitung n4 p38-46 1964 (Copies available only to DDC users).

Descriptors: (*Language, Analysis), Machine translation, Automatic, Programming(Computers), Information retrieval, Italy.

The newly organized language research section of IDAMI in Milan is conducting an experimental investigation on automatic English sentence analysis. This investigation has 2 purposes: (1) to elaborate and improve the automatic correlation procedure of von Glasersfeld and Burns, and implement it in a computer program by means of a 'Multistore' system; and (2) to use syntactic correlation procedure to isolate semantic factors for the analysis or interpretation of the meaning of English sentences, and employ these semantic factors in the correlation procedure in order to reduce the output of semantically unacceptable sentence analysis. (Author)

AD-617 881 Div. 32/4, 26/2
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
AGE REPLACEMENT WITH DISCOUNTING,
by Bennett Fox. Jun 65, 10p
Rept. no. P-3161

Contract Nonr365618

Unclassified report

Prepared in cooperation with the University of California, Berkeley.

Descriptors: (*Replacement theory, Costs), (*Failure(Mechanics), Replacement theory), Operations research, Life expectancy, Distribution theory, Reliability.

In considering age replacement with discounting for known failure distribution, the principal results are for the case when the failure rate is continuous and strictly increasing to infinity. It is also shown what happens for small discount rate. For unknown failure distribution, the author gives the minimax strategy. (Author)

AD-617 887 Div. 28/5
CFSTI Prices: HC$2.00 MF$0.50

Hawaii Univ., Honolulu.
A MODEL OF THE NEGOTIATION PROCESS,
by Otomar J. Bartos. Jan 65, 46p
Grant AF AFOSR62 314 Proj. 9779, Task 9779 02
AFOSR 65-0076

Unclassified report

Descriptors: (*Bargaining, Mathematical models), (*Social psychology, Bargaining), Group dynamics, Game theory, Probability, Learning, Sociology, Psychology, Personality, Behavior.

A mathematical model of negotiation is described. The basic assumption is that each negotiator always prefers the proposal that has the highest utility for him, the utility being given by the product between payoff and belief in 'acceptability' of the proposal. The belief in acceptability (subjective probability) is, in turn, assumed to change with each speech delivered during the session: it increases whenever a colleague endorses the proposal, decreases whenever a colleague fails to join others in endorsing the proposal. It is shown that the model has some desirable properties; it implies that the most frequently endorsed proposal is always believed to be the most acceptable proposal, that a negotiator who is alone in endorsing a proposal ultimately stops endorsing it, that the negotiator who speaks last has the greatest influence, that the very first speaker always endorses the proposal that has the highest payoff for him, that concession always occurs towards the proposal that has the 'next highest' payoff, and that a majority can assure that the acceptance of any proposal that has non-negative payoff to everybody is achieved. (Author)

AD-617 903 Div. 32/4, 15/2, 26/2
CFSTI Prices: HC$1.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa.
Graduate School of Industrial Administration.
DEMON, MARK II: EXTREMAL EQUATIONS SOLUTION AND APPROXIMATIONS.
Management sciences research rept.,
by A. Charnes, W. W. Cooper, J. K. DeVoe, and D. B. Learner. Apr 65, 23p Rept. no. MSRR-40
Contract Nonr76024, Proj. NR047 048

Unclassified report

Supported in part by a Ford Foundation Grant and Northwestern Univ. under Contract Nonr1228 10, and Projs. NR1228 10 and NR047 021 with U. S. Office of Naval Research.

Descriptors: (*Economics, Decision making), (*Decision making, Economics), (*Management engineering, Economics), Numerical analysis, Equations, Probability, Optimization, Commerce, Operations research.

This paper develops a new method for the solution of DEMON-type functional equations. It is shown how the latter can be reduced to solution of a separated system of simpler equations which, for discrete distributions, can be solved by linear programming methods. The reduction also permits general characteristics of the solutions to be inferred. Additionally, methods of approximation and bounding are developed and interpreted for the general case. Because of the importance accorded to log-normal distributions for the new-product marketing problem, further details and developments are undertaken with reference to this class of distributions and then illustrated by reference to the single-parameter case. (Author)

06. Biological and Medical Sciences

AD-617 229 Div. 16/2, 16/3

Columbia Univ., New York. Coll. of Physicians and Surgeons.
PHENETHYL ALCOHOL. I. EFFECT ON MACROMOLECULAR SYNTHESIS OF ESCHERICHIA COLI,
by Herbert S. Rosenkranz, Howard S. Carr, and Harry M. Rose. 11 Dec 64, 17p
Contract Nonr26689; Grant PHS AI 05111, Proj. NR103 574
Unclassified report

Pub. in Journal of Bacteriology v89 n5 p1354-69 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Alcohols, Desoxyribonucleic acids), (*Desoxyribonucleic acids, Synthesis), (*Escherichia coli, Desoxyribonucleic acids), Metabolism, Enzymes, Inhibition, Ribonucleic acids, Nucleic acids, Amino acids, Aromatic compounds, Phosphoric monoester hydrolases, Temperature, Viability, Growth, Proteins, Glucose, Bacteriophages.

An investigation of the mode of action of phenethyl alcohol produced the following results. Phenethyl alcohol had no effect on the physicochemical properties of isolated deoxyribonucleic acid (DNA). The DNA isolated from phenethyl alcohol-treated bacteria had physicochemical properties identical with those of DNA isolated from normal cells. The metabolic functions most sensitive to the inhibitory action of phenethyl alcohol appeared to be the process of enzyme induction and, possibly, the synthesis of messenger ribonucleic acid. Phenethyl alcohol did not affect the polyuridylic acid-mediated synthesis of polyphenylalanine in a cell-free amino acid-incorporating system. (Author)

AD-617 279 Div. 16/5
CFSTI Prices: HC$5.00 MF$1.00

Indiana Univ., Indianapolis. School of Dentistry.
A FLUORESCENT DYE METHOD FOR DEMONSTRATING LEAKAGE AROUND DENTAL RESTORATIONS.
Master's thesis,
by Arden Gale Christen. 1965, 156p
Unclassified report

Descriptors: (*Test methods, Dentistry), (*Dentistry, Dyes), (*Dyes, Fluorescence), Teeth, Diseases, Drugs, Radioactive isotopes, Toxicity, Penetration, Bovines, Humans, Laboratory animals, Therapy, Medical research, Reviews.

This study was conducted to determine if the fluorescent dyes, rhodamine B, fluorescein and demethylchlortetracycline could demonstrate microleakage around dental restorations. A new simplified fluorescent technique for testing and scoring microleakage was presented. A total of 87 class V cavities were prepared in 32 bovine mandibular incisor teeth. The cavities were divided into four groups and restored with representative leaking and non-leaking fillings. The teeth were immersed in the test dyes for periods varying from five minutes to one hour. After drying, the teeth were sectioned with separating discs and viewed through a binocular microscope, under ultraviolet light. With one exception, the dyes satisfactorily showed marginal leakage of filling materials. The margins of the 24 hour amalgam filling with no cavity liner showed great penetration with fluorescein and rhodamine B. In a second group of amalgams, cavity varnishes greatly reduced marginal leakage. All gutta percha restorations showed gross leakage. The fluorescent dyes tested did not show microleakage of zinc oxide eugenol restorations due to a 'quenching' of fluorescence. Sound enamel of bovine and human teeth was impermeable to the fluorescent dyes tested. Of the dyes tested, fluorescein and demethylchlortetracycline showed the greatest promise for future research. They are inexpensive, non-toxic in humans, and contrast sharply with the tooth's natural fluorescence.

AD-617 289 Div. 16/1, 28/2
CFSTI Prices: HC$4.00 MF$1.00

Texas Technological Coll., Lubbock. School of Engineering.
BIOMECHANICAL INVESTIGATION OF STATIC PULL WITH CONSTANT SHOULDER TORQUES.
Master's thesis,
by Morton Bob Berman. May 65, 126p
Unclassified report

Descriptors: (*Psysiology, Performance(Human)), (*Biophysics, Job analysis), (*Job analysis, Physiology), Human engineering, Anthropometry, Oxygen consumption, Pulse rate, Arms, Joints(Physiology), Weight, Torque, Motion, Engineering, Analysis of variance, Graphics, Tables, Muscles, Exercise.

The purpose of the study was to investigate the effect on physiological functions of doing static work while maintaining constant shoulder torques in a midsagittal plane. The torques were applied by statically resisting a weighted lever arm. Each level of torque was held constant while the angle of elbow flexion and the height of the shoulder below the lever arm were varied. It was concluded that the best elbow flexion angle for static lever work is in the vicinity of 100 degrees, with the best working shoulder height between 10 to 15 inches below the point of application of force. It was further concluded that 100 degrees of elbow flexion allows almost steady state of ventilation rate over the entire work period for all loads. These conclusions were based on the population used and within the limits of the investigation.

AD-617 295 Div. 16/7, 16/8
CFSTI Prices: HC$3.00 MF$0.75

Minnesota Univ., Minneapolis.
A COMPARATIVE STUDY OF THE USE OF CERTAIN ANCILLARY SERVICES IN SELECTED GOVERNMENTAL AND NON-GOVERNMENTAL HOSPITALS.
Doctoral thesis,
by Rodney J. Zimmerman. 15 Mar 65, 84p
Unclassified report

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Descriptors: (*Hospitals, Military medicine), (*Military medicine, Hospitals), (*Medical examination, Hospitals), Air Force, Medical laboratories, Tests, Electrocardiography, Heart, Pathology, Medical personnel, Diagnosis, Therapy, Costs, Statistical analysis.

The use of laboratory tests and electrocardiograms is analyzed in the voluntary hospital system, represented by two church-related hospitals, and in the governmental hospital system, represented by a locally owned and operated hospital district facility and a federal military hospital. Differences are tested for statistical significance and an effort is made to relate detected differences in the voluntary hospitals to the form of payment by the patient. Two objectives are of prime importance: (1) to establish a rate at which physicians in each of the two hospital systems order diagnostic studies for their

patients, and (2) to establish whether the fact that a patient admitted to a voluntary hospital does or does not have hospital insurance coverage influences the attending physician's requests for diagnostic studies. (Author)

AD-617 312 Div. 16/6, 2/7
CFSTI Prices: HC$3.00 MF$0.75

Saint Louis Univ., Mo.
WINDS, STABILITY, AND TWENTY-FOUR HOUR SULFUR DIOXIDE CONCENTRATIONS IN METROPOLITAN SAINT LOUIS.
Master's thesis,
by Eric Walther. 1965, 96p
Unclassified report

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Descriptors: (*Air pollution, Sulfur compounds), (*Sulfur compounds, Air pollution), (*Meteorological parameters, Air pollution), Waste gases, Dioxides, Wind, Stability, Correlation techniques, Samplers, Collecting methods, Missouri.

A study of the relationships between wind, vertical temperature data, and twenty-four hour sulfur dioxide concentration data, collected from December 5, 1963 to February 28, 1963, was made. The sulfur dioxide samples were collected at twenty sampling sites in the St. Louis metropolitan area. The sulfur dioxide concentrations were related to the stability categories and wind direction. An analysis of the vertical temperature structure, recorded by the thermal sensing units on a TV tower, showed the 249-452 feet layer to be more unstable than the 127-249 feet layer when hourly frequencies of the stability categories were considered. An atmospheric stability, topography, and sulfur dioxide relationship showed all sampling sites located above 500 feet mean sea level experienced maximum average stability-concentrations only during stable conditions in the 249-542 feet layer. There was no build-up in the sulfur dioxide concentrations indicated during the longer stable periods.

AD-617 366 Div. 16/11
CFSTI Prices: HC$1.00 MF$0.50

American Oil Co., Whiting, Ind.
ACUTE TOXICITY IN RATS AND RABBITS,
25 Jun 65, 16p
Contract N0bs90267, Proj. SR001 03 01, Task 606
Unclassified report

Descriptors: (*Hydraulic fluids, Toxicity), (*Toxicity, Hydraulic fluids), Dosage, Skin, Eye, Diseases, Pathology, Rats, Rabbits, Dogs, Test methods.

Compound LF-4713 was administered orally to albino rats at dosage levels extending from 250 to 10,000 mg./kg. Pharmacodynamic and/or toxic signs were essentially absent at dosage levels through 5000 mg./kg. At 10,000 mg./kg. hypoactivity, ataxia, nasal and oral porphyrin discharge and flaccidity were observed over a 48-hour period. Three-of-five rats died within 48 hours at this dosage level. The acute oral LD50 value was 9260 (6360-13,500) mg./kg. In primary skin and dermal LD50 studies in rabbits, LF-4713 was found to be devoid of irritating properties. No pharmacotoxic signs or mortalities were observed in either experiment. Instillation of LF-4713 into the eye of albino rabbits produced a mild conjunctivitis of 48-hour duration. The results of this test indicate that LF-4713 is not an irritant to the eye mucosa of the rabbit. (Author)

AD-617 374 Div. 16/2, 16/11
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
TRANSFORMATION OF STAPHYLOCOCCUS UNDER THE INFLUENCE OF KILLED ULTURES OF SALMONELLA TYPHIMURIUM AND LISTERIA MONOCYTOGENES, RESISTANT TO 75,000 UNITS/ML OF STREPTOMYCIN,
by V. N. Polshkova. 1965, 11p
Trans-1066
TT 65-62557
Unclassified report

Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) v55 n4 p66-70 1963.

Descriptors: (*Staphylococcus, Streptomycins), Salmonella, Listeria monocytogenes, Antibiotics, Pharmacology, Sensitivity, Antigen-antibody reactions, Culture media, USSR.

The work shows that killed autoclaved cultures of Listeria monocytogenes, resistant to 75,000 Units/ml of streptomycin, used in the capacity of a donor, transforms streptomycin resistance in the Staphylococcus pyogenes aureus recipient, analogous to the transforming action of the Salmonella typhimurium culture resistant to 75,000 Units/ml and killed at 75C. The rise of streptomycin resistance to staphylococcus cultivated in the autoclaved Listeria culture ran a parallel course with the rise of the resistance of staphylococci reared in a heated salmonella culture. The fact of transmission of streptomycin resistance to staphylococcus by microorganisms of two different genera points to the thermostability and similarity of factors of streptomycin resistance for staphylococci, listeria and salmonella. (Author)

AD-617 375 Div. 16/6, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
ORNITHOSIS OUTBREAK AT A FOWL PLANT IN KREMENETS,
by V. T. Shugailo and P. G. Zuenko. 1965, 5p
Trans-1067
TT 65-62558
Unclassified report

Vspyshka Ornitosa na Ptitsekombinate v Krementse. Trans. of Zhurnal Mikrobiologii Epidemiologii i Immunobiologii (USSR) v40 n8 p141-2 1963.

Descriptors: (*Virus diseases, Birds), (*Industrial medicine, Epidemiology), Birds, Diseases, Diagnosis, Medical examination, Antigen-antibody reactions.

Conclusions: (1) When there is suspicion of ornithosis, it is necessary to consider epidemiological (contact with infected birds) and clinical data, and to make extensive use of laboratory methods of diagnosis. (2) The data presented from the laboratory investigation testifies that ornithosis is encountered considerably more often than it is diagnosed. (Author)

AD-617 376 Div. 16/2, 16/4
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
EXCRETION OF DYSENTERY BACTERIOPHAGE BY MOUSE KIDNEYS IN EXPERIMENTAL DYSENTRY INFECTION,
by K. S. Zobnina. Aug 64, 10p Trans-1156
TT 65-62559 Unclassified report

Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) v56 n9 p84-8 1963.

Descriptors: (*Dysentery, Bacteriophages), (*Bacteriophages, Excretion), Kidneys, Urine, Antigens + antibodies, Immunity, Purification, Mice, USSR.

The excretion of toxic, antigenic substrates and viruses with urine has been demonstrated. The excretion of viruses by immune and nonsusceptible annals was observed and the question was posed of the role of this process in the defense of the organism against infection. Attempts have been made to use physiological methods in studying the mechanism of this excretion using a phage model. The excretion of antigens as a physiological defense mechanism was also examined. The opinion was expressed that the mechanism of kidney excretion of antigens is similar to the excretion of proteins.

AD-617 387 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
A STUDY OF PLAGUE BACTERIOPHAGES AND BACTERIAL MUTANTS RESISTANT THERETO. I. BIOLOGICAL PROPERTIES OF PLAGUE BACTERIOPHAGES,
by A. I. Volosivets. Aug 64, 9p Trans-1155
TT 65-62561

Unclassified report

Trans. of Byulleten Experimentalnoi Biologii i Meditsiny (USSR) v56 n9 p81-4 1963.

Descriptors: (*Bacteriophages, Pasteurella), (*Pasteurella, Bacteriophages), Antigen-antibody reactions, Diseases, Immunity, Mutations, Adsorption, Viability, USSR.

Results are reported of a study of biological properties of plague phages which were used to obtain phage-resistant variants of plague bacteria and to elucidate their origin. The properties studied include the range of phage action, phage specificity, adsorbtive capability, duration of intracellular development, and average yield per one bacterial cell.

AD-617 388 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
COAGULATION OF BLOOD PLASMA BY PLAGUE AND PSEUDOTUBERCULOSIS BACILLI,
by I. V. Domaradskii, G. A. Yaromyuk, L. V. Vasyukhina, and A. V. Korotaeva. Aug 64, 7p Trans-1152
TT 65-62551

Unclassified report

Trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) (17) v55 n7 p79-82 1963.

Descriptors: (*Blood coagulation, Pasteurella), (*Blood plasma, Coagulation), Bacillus, Fibrin, Diseases, USSR.

The study shows that the capacity to coagulate plasma is a characteristic feature of plague, but not of pseudotuberculosis, bacillus, since all the strains of pseudotuberculosis causative agent investigated did not evidence, after repeated testing, a capacity to coagulate plasma. The persistent absence of plasmocoagulation and fibrinolytic activity in pseudotuberculosis bacillus suggests that in this case one is dealing with a qualitative distinction between plague and pseudotuberculosis bacilli. Inasmuch as the capacity for plasmocoagulation, as well as fibrinolytic activity, is a feature which denotes a qualitative distinction between plague and pseudotuberculosis bacilli, the plasmocoagulation test can be of significant interest for the differential diagnosis of plague and pseudotuberculosis bacilli.

AD-617 389 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
A METHOD OF ACCELERATED DIAGNOSIS OF THE TULAREMIA CAUSATIVE AGENT IN RODENT CORPSES,
by A. I. Leontev. 1965, 4p Trans-1054
TT 65-62552

Unclassified report

Uskorennyi Metod Diagnostiki Vozbuditelya Tularemii v Trupakh Gryzunov: Annotatsiya, Trans of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) v40 n11 p146 1963.

Descriptors: (*Pasteurella, Diagnosis), Diseases, Luminescence, Microscopy, Antigens + antibodies, Rats, USSR.

The method of luminescent microscopy with the use of fluorescent antibodies made it possible to rapidly detect the tularemia causative agent in the organs of dead rodents in 100% of the cases studied.

AD-617 391 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
USE OF THE FLUORESCENT ANTIBODY METHOD IN STUDYING ANTIGEN-ANTIBODY REACTION IN TISSUES. STUDY OF LOCALIZATION OF ANTIRENAL AND ANTIHEPATIC ANTIBODIES IN HOMO- AND HETEROLOGOUS TISSUES,
by I. I. Kolker. Aug 64, 12p Trans-1148
TT 65-62554

Unclassified report

Trans. of Eksperimentalnaya Khirurgiya i Anesteziologiya (USSR) v8 n2 p57-64 1963.

Descriptors: (*Tissues(Biology), Antigen-antibody reactions), (*Antigen-antibody reactions, Tissues-(Biology)), Fluorescence, Tracer studies, Labeled substances, Kidneys, Liver, Immunity, Blood vessels, Capillaries, USSR.

Conclusions: Antirenal antibodies exhibit selective localization in a homologous organ and are located in lesser amounts in heterologous organs. The maximum in localization of antirenal antibodies has been noted in renal glomeruli, especially in capillary bundles of glomeruli. In heterologous organs antibodies are generally localized about blood vessels and capillaries. Antihepatic antibodies do not manifest this selective localization, distributing more or less uniformly throughout all organs. (Author)

AD-617 392 Div. 16/4, 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
THE EFFECT OF CERTAIN PHYSICAL FACTORS ON THE CAUSATIVE AGENTS OF SOYBEAN SEED BACTERIOSES,
by M. V. Krasnova. Jun 64, 6p Trans-1122
TT 65-62555 Unclassified report

Trans. of Mikrobiologichnyi Zhurnal (USSR) v25 n5 p50-2 1963.

Descriptors: (*Plants(Biology), Diseases), Bacteria, Seeds, Germicides, Agriculture, Ultrahigh frequency, Electromagnetic waves, Ultrasonic radiation, Electric currents, USSR.

The physical agents used in treating soybean seed included ultrahigh frequencies, electric current, and ultrasound.

AD-617 393 Div. 16/2
CFSTI Prices: HC$1.00 MF$0.50

Army Biological Labs., Frederick, Md.
SEROLOGICAL INVESTIGATIONS ON THE PLAGUE. REPORT 14. TESTING OF CERTAIN SEROLOGICAL REACTIONS IN EPIZOOTOLOGIC EXAMINATION IN NATURAL PLAGUE FOCI,
by Yu. G. Suchkov. Aug 64, 11p Trans-1153
TT 65-62556
Unclassified report

Serologicheskii Issledovaniya pri Chune. Soobshchenie 14. Isputanie Nekotorykh Serologicheskikh Reaktsii pri Epizootologicheskii Obsledovanii v Prirodnykh Ochagakh Chumy, Trans. of Zhurnal Mikrobiologii Epidemiologii i Immunobiologii (USSR) v41 n1 p 135-40 1964.
Available copy will not permit fully legible reproduction.

Descriptors: (*Pasteurella, Antigen-antibody reactions), Diseases, Immunity, Antigens + antibodies, Inhibition, Erythrocytes, Diagnosis, Rats, USSR.

Conclusions: The hemagglutination-inhibition and antibody-neutralization reactions with formalinized erythrocytes can be used under two conditions for the purpose of epizootological examination for plague of wild rodents. It was shown that wild rodents which contain antibodies to plague bacillus in their blood are found significantly oftener in a natural focus than animals from which the causative agent can be isolated. From results of the hemagglutination-inhibition reaction, the intensity and approximate times of plague epizootics can be estimated (from antibodies in young animals). The antibody-neutralization reaction can advisably be used in investigating perished biopsy animals, decaying material, when isolation of the plague causative microorganism represents great difficulty and is not always possible, and also in other cases when there is a need for rapid diagnosis of plague infection. (Author)

AD-617 409 Div. 16/1
CFSTI Prices: HC$2.00 MF$0.50

Indiana Univ., Bloomington.
AN INVESTIGATION OF VISION DURING INVOLUNTARY SACCADIC EYE MOVEMENTS.
Master's thesis,
by Robert Wesley Ebbers. Jun 65, 41p
Contract AF33 608 1070
Unclassified report

Descriptors: (*Eye, Motion), (*Vision, Physiology), Thresholds(Physiology), Visual perception, Visual acuity, Light, Stimulation, Intensity, Ophthalmology.

It is concluded that, contrary to the much referred to work of Ditchburn and Lettvin, vision does exist, though impaired, during involuntary saccadic eye movements as well as during voluntary saccadic eye movements as shown by Volkmann. In practical applications, where the effects of eye movements are to be considered, the degree of vision present during the involuntary and the voluntary saccade must be allowed for rather than assuming a total blanking of vision as has previously been accepted. (Author)

AD-617 427 Div. 16/11, 16/9

Army Medical Research and Nutrition Lab., Denver, Colo.
TESTING OF FAT EMULSIONS FOR TOXICITY. III. TOXICITY STUDIES WITH NEW FAT EMULSIONS AND EMULSION COMPONENTS,
by S. W. Thompson, L. D. Jones, J. F. Ferrell, R. D. Hunt, and H. C. Meng. 1965, 21p
Unclassified report

Pub. in The American Journal of Clinical Nutrition v16 n1 p43-61 Jan 1965. (Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Fats, Colloids), (*Toxicity, Fats), Parenteral infusion, Injection(Medicine), Histological techniques, Pathology, Lipids, Liver, Reticuloendothelial system, Cells(Biology).

Extensive studies were conducted at four separate laboratories to evaluate the chemical and physical properties, and the biological effects of two fat emulsions: Intralipid (20 per cent) and Lipofundin (15 per cent). In addition, a variety of experimental emulsions and emulsion components, produced in the laboratory, were tested to evaluate the effects of various formulas and individual components in order to evaluate more adequately the results obtained with the two commercial preparations tested, and to compare laboratory and commercial lots of the same type of product. Lipomul, which had previously received extensive chemical, physical and biological testing, was also subjected to the same test procedures as applied to the experimental products to serve as a control. For the parameters investigated, the results of these studies indicated that the emulsion best tolerated was a laboratory preparation composed of 10 per cent soybean oil and 1.2 per cent egg yolk phosphatide in a 2.5 per cent aqueous solution of glycerol (test preparation 107). Adverse clinical findings and abnormal liver functions were not observed in animals given infusions of test preparation 107, nor were histopathological findings encountered which are known to represent a functionally damaged liver. Commercial Intralipid proved to be the next best tolerated emulsion.

AD-617 430 Div. 16/9

Army Medical Research and Nutrition Lab., Denver, Colo.
SYMPOSIUM ON INTRAVENOUS FAT EMULSIONS. Preface,
by John F. Mueller and John E. Canham. 1965, 3p
Unclassified report

Pub. in The American Journal of Clinical Nutrition v16 n1 p1-3 Jan 1965. (Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Fats, Colloids), (*Parenteral infusions, Fats), Nutrition, History, Symposia.

AD-617 436 Div. 16/13, 16/10

Tulane Univ., New Orleans, La. School of Medicine.
THE EFFECT OF X-IRRADIATION ON RENAL DAMAGE SECONDARY TO ISCHEMIA, (30085),
by J. U. Schlegel and A. K. Gup. 8 Feb 65, 3p

Contract Nonr47507, Grant PHS CRT5057
Unclassified report

Pub. in Proceedings of the Society for Experimental Biology and Medicine v119 p14-6 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kidneys, Transplanation), (*Radiation effects, Kidneys), Blood volume, Surgical techniques, Anoxia, X-rays, Damage, Therapy.

On the basis of the results obtained, it appears reasonable to suggest that the effect of radiation in modifying acute rejection is possibly secondary to its effect upon ischemia. Whatever the mechanism may be, it appears that a small amount of radiation has a beneficial effect upon the kidney damaged by anoxia, a finding which may have therapeutic value in a variety of conditions. (Author)

AD-617 443 Div. 16/4

Woods Hole Oceanographic Institution, Mass.
UNDERWATER CALLS OF TRICHECHUS (MANATEE),
by William E. Schevill and William A. Watkins.
1965, 2p
Contract Nonr402900
Unclassified report

Pub. in Nature v205 n4969 p373-4 Jan 23 1965
(Copies available only to DDC users).

Descriptors: (*Aquatic animals, Marine biological noise), (*Marine biological noise, Aquatic animals), Underwater sound, Hearing.

AD-617 444 Div. 16/3

California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
THE USE OF MAGNETIC FIELDS IN NEW APPROACHES TO FRACTIONATION OF PARTICLES AND MOLECULES IN LIQUID COLUMNS,
by Alexander Kolin. 1964, 11p
Unclassified report

Pub. in Protides of the Biological Fluids p410-9 1964
(Copies available only to DDC users).
Supported by ONR.

Descriptors: (*Mass spectroscopy, Biochemistry), Liquids, Distillation, Particles, Separation, Magnetic fields, Electrostatic fields, Electromagnetic fields, Electrophoresis, Thermal conductivity, Motion.

Sorting of particles of different species dissolved or suspended in an electrically conductive fluid, such as buffer solution, can be accomplished by subjecting them to forces which will tend to set them in motion with speeds differing from one species of particle to another. Two types of moving forces will be considered in this paper: (1) Electrostatic forces causing electrophoretic migration and (2) electromagnetic forces giving rise to electromagnetophoresis. In the former case we shall employ a magnetic field to cause a motion of the buffer solution (which will stabilize it against thermal convection) rather than to move the particles relative to the solution. (Author)

AD-617 447 Div. 16/3

California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
MAGNIFICATION OF RESOLVING POWER OF COLLECTORS IN FREE FLOW ELECTROPHORESIS,
by Alexander Kolin. 11 Dec 64, 6p
Unclassified report

Pub. in Journal of Chromatography v17 p532-7 1965
(Copies available only to DDC users).
Supported by ONR.

Descriptors: (*Electrophoresis, Collecting methods), (*Resolution, Electrophoresis), Separation, Fluid flow, Thermal conductivity, Distillation, Chromatographic analysis.

By means of expansion of the width of the flow channel, it is possible to augment the resolving power of a collecting system in continuous flow fractionations. The device is applicable to any method of continuous flow fractionation based on injection of the mixture as a narrow streak. The operation of the method is demonstrated in the case of serpentine channel electrophoresis. (Author)

AD-617 451 Div. 16/11

Naval Medical Research Inst., Bethesda, Md.
BLOCKADE PHENOMENA AT THE MAMMALIAN NEUROMUSCULAR SYNAPSE. COMPETITION BETWEEN REVERSIBLE ANTICHOLINESTERASES AND AN IRREVERSIBLE TOXIN,
by S. L. Friess and R. C. Durant. 2 Jan 64, 9p
Proj. NR107 613
Unclassified report

Pub. in Toxicology and Applied Pharmacology v7 n3 p373-81 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Neuromuscular transmission, Parasympathomimetic agents), (*Cholinesterase inhibitors, Neuromuscular transmission), Skeletal muscle relaxants, Physostigmine, Toxicity, Stimulation, Nerves, Glycosides, Steroids, Drugs, Chemoreceptors, Mammals, Echinodermata.

The irreversible destruction of twitch response in the rat phrenic nerve-diaphragm preparation by holothurin A, a glycosidic steroid mixture elaborated by the Bahamian sea cucumber, has been found to be antagonized by neostigmine. In terms of concentration required to protect against twitch destruction by holothurin, neostigmine is 10,000 times less effective than the classical anticholinesterase physostigmine. With each protective agent, the anti-holothurin effect decays progressively when the incubating concentration is increased beyond a characteristic optimal value. These findings bear no distinct relationship to the purely anticholinesterasic potencies of the protective agents and are interpreted in terms of possible drug-chemoreceptor interactions and geometric deformation operative at the mammalian neuromuscular synapse. (Author)

AD-617 454 Div. 16/2

Columbia Univ., New York. Coll. of Physicians and Surgeons.
IMMUNOCHEMICAL STUDIES ON CROSS-REACTIONS OF ANTIPNEUMOCOCCAL SERA. IV. CROSS-REACTIONS OF HORSE TYPE XXII ANTIPNEUMOCOCCAL SERUM WITH DEXTRANS,
by Joel W. Goodman and Elvin A. Kabat.
31 Jan 64, 7p
Grant NSF G18727
Unclassified report

Pub. in Journal of Immunology v93 n2 p213-9 Aug 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Diplococcus pneumoniae, Immune serums), (*Immune serums, Dextran), Inhibition, Carbohydrates, Chemical precipitation, Absorption, Antigens + antibodies.

A study of the cross-reactions of type XXII horse anti-pneumococcal serum with various dextrans has shown the presence of two populations of cross-reacting antibody molecules. The reaction of one of these with B512 dextran (N236) is inhibited by the isomaltose series of oligosaccharides, isomaltohexaose and isomaltoheptaose being equal on a molar basis and the best inhibitors. On absorption of these antibodies, a second population remains which cross-reacts best with dextrans with high proportions of 1,2- and 1,3-like linkages, and for which the best inhibitors are the disaccharides kojibiose, trehalose and isomaltose; the higher oligosaccharides of the isomaltose series were equal in potency to isomaltose on a molar basis. (Author)

AD-617 455 Div. 16/1

Pennsylvania Hospital, Philadelphia.
PHYSIOLOGY AND ANATOMY OF THE CELL MEMBRANE: THE PHYSICAL STATE OF WATER IN THE LIVING CELL,
by Gilbert Ning Ling. 1965, 10p
Grants NIH GM11422 01, NSF GB13, Proj. NR105 327
Unclassified report

Pub. in Federation Proceedings v24 n2 pt3 pS103-12 Mar-Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cells(Biology), Physiology), (*Cell structure, Membranes(Biology)), (*Freezing, Cells-(Biology)), Permeability, Electrolytes(Physiology), Ions, Water, Proteins, Adsorption, Dehydration, Alcohols, Carbohydrates, Ice.

The experimental observations leave little doubt that more than 90% of the intracellular ions is adsorbed on cell proteins; dehydration per se, therefore, does not necessarily lead to the buildup of very high concentrations in the cell. Although if, for example, ice formation damages the cell protein, release of adsorbed ions is to be expected. Evidence presented elsewhere shows that the exclusion of polyhydric alcohols and sugars from cell water appears to follow essentially the same type of mechanism discussed above for Na ion exclusion. Thus, the protection of glycerol and sucrose against cell damage may be due to reduction of ice formation; merging of the polarization around these H-bonding molecules with the polarization due to the cell proteins stabilizes the protein-water system in the cell. It has long been known that these nonelectrolytes protect against protein denaturation in vitro. Further in vitro studies on freeze-thaw denaturation of proteins and its protection by compounds as yet untried or unknown may prove profitable.

AD-617 467 Div. 16/2

Pennsylvania Univ., Philadelphia.
MUTANT OF SALMONELLA TYPHIMURIUM DEFICIENT IN THE CARBON DIOXIDE-FIXING ENZYME PHOSPHOENOLPYRUVIC CARBOXYLASE,
by Theodore S. Theodore and Ellis Englesberg.
18 May 64, 10p
Unclassified report

Pub. in Journal of Bacteriology v88 n4 p946-55 Oct 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Salmonella, Mutations), (*Metabolism, Salmonella), Carbon dioxide, Enzymes, Carboxy-lyases, Oxidation, Pyruvates, Glucose, Nucleotides, Adenosine phosphates, Acetates, Growth.

Resting cells of Salmonella typhimurium wild type (C+dg8) and the C-dg8 mutant characterized by impaired glucose and glycerol metabolism are able to oxidize Krebs cycle intermediates to the same extent. The wild type oxidized glucose and pyruvate completely, and the mutant oxidized these substrates at a reduced rate and incompletely, with the accumulation of acetate. Resting cells of the wild type in the presence of NaHCO3-C14 and glucose incorporated 11 times more CO2 than did similar suspensions of the mutant. Extracts prepared from cells previously grown in a mineral glucose supplemented medium revealed that the mutant was deficient in the CO2-fixing enzyme phosphoenolpyruvic carboxylase (PEP carboxylase). This enzyme was found to be present in the wild-type extracts. It catalyzes the formation of oxaloacetate from phosphoenolpyruvate and CO2 in the presence of Mn(++) or Mg(++). No added nucleotides are required for its activity. Since only low levels of phosphoenolpyruvic carboxykinase activity are present in extracts prepared from both kinds of cells grown in a mineral glucose supplemented medium, and perhaps only trace amounts of the malic enzyme, phosphoenolpyruvic carboxytransphosphorylase, and of the enzyme requiring pyruvate, CO2, and adenosine triphosphate are present, it was concluded that PEP carboxylase is required for CO2 fixation in this organism. (Author)

AD-617 468 Div. 16/2, 16/11

Pennsylvania Univ., Philadelphia. School of Medicine.
PREVENTION OF THE EMERGENCE OF ANTIBIOTIC-RESISTANT STRAINS OF BACTERIA BY ATABRINE,
by M. G. Sevag. 16 Apr 64, 4p
Unclassified report

Pub. in Archives of Biochemistry and Biophysics v108 n1 p85-88 Oct 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Antibiotics, Cinchona alkaloids), (*Bacteria, Sensitivity), Streptomycins, Tetracyclines, Penicillins, Chloramphenicol.

In addition to spermine and spermidine, atabrine has been found to prevent effectively the emergence of strains resistant to streptomycin, sulfathiazole, novobiocin, erythromycin, tetracycline, penicillin, and chloramphenicol. Since atabrine already has been used widely in medical practice, we believe that it can now be incorporated into antibiotic therapy to prevent the emergence of resistant strains of bacteria. These findings are suggestive also of their possible application in early cancerous and viral systems. (Author)

AD-617 471 Div. 16/2

Notre Dame Univ., Ind.
INFLUENCE OF SALMONELLA TYPHIMURIUM ON ILEUM AND SPLEEN MORPHOLOGY OF GERMFREE RATS,
by P. Leonard Knight, Jr. and Bernard S. Wostmann.
1964, 5p
Unclassified report

Pub. in Proceedings of the Indiana Academy of Science for 1963 v72 p78-82 1964 (Copies not available to DDC or Clearinghouse customers)
Supported by grants from ONR and NIH.

Descriptors: (*Salmonella, Intestines), (*Intestines, Morphology(Biology)), (*Spleen, Morphology(Biology)),

Tissues(Biology), Cells(Biology), Histological techniques, Connective tissue, Rats.

The effects of microbial flora on lymphatic tissue such as the spleen have recently been investigated by Bauer et al. in mice; Thorbecke et al. and Gordon in chickens; Miyakawa et al. and Sprinz et al. in guinea pigs and Gustafsson in rats. The studies presented here extend the above observations to the rat which has been mono-associated with Salmonella typhimurium and more specifically to the effects this species has on the cellular elements of the intestine (ileum) and the morphology of the spleen.

AD-617 508 Div. 16/15

Wilford Hall Hospital (Air Force), Lackland AFB, Tex.
A COMPARISON OF THE AOC AND THE DVORINE PSEUDO-ISOCHROMATIC TESTS IN COLOR VISION TESTING,
by Edward R. Seefelt. 19 Jan 65, 7p
Monograph no. 338
Unclassified report

Pub. in American Journal of Optometry and Archives of American Academy of Optometry p1-6 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Color vision, Tests), Ophthalmology, Medical examination, Reliability, Air force personnel, Training.

Color vision tests were given to 210 airmen in basic training at the Medical Processing Division, Lackland Air Force Base, Texas. Both the AOC and the Dvorine color tests were administered to each airman to separate color Defectives from color Normals. The type of color vision present was determined by the use of an anomaloscope. The test plates missed by each individual were recorded by plate numbers, and the data were analyzed to determine the diagnostic value of the plates for classifying Deutans and Protans. The test plates were ranked by the Judd and the Sloan-Green criteria in order to determine the worth of individual plates in separating color Normals from color Defectives. The ranks of the combined sets showed that, in general, the Dvorine plates ranked higher than the AOC plates. Misclassification with the AOC plates was 5.7 per cent and with the Dvorine plates 2.4 per cent. The average numbers of errors were 2.3 for Normals and 9.7 for Defectives with the AOC test. With the Dvorine test, the numbers of errors were 0.6 and 11.7, respectively, for Normals and Defectives. Neither the Dvorine nor the AOC tests demonstrated any significant value in classifying Deutans and Protans. In addition, the contention that the Dvorine test might be used quantitatively did not seem to be supported by the data. An analysis of the test results from the AOC and Dvorine tests administered to the same subjects indicates that the Dvorine test is a superior dichotomous test when compared to the AOC test. (Author)

AD-617 509 Div. 16/15

Wilford Hall Hospital (Air Force), Lackland AFB, Tex.
AN EVALUATION OF THE VALIDITY AND RELIABILITY OF THE AOC 15-PLATE PSEUDO-ISOCHROMATIC TEST IN ROUTINE TESTING,
by Edward R. Seefelt. 1964, 12p Monograph no. 329
Unclassified report

Pub. in American Journal of Optometry and Archives of American Academy of Optometry p1-11 Jun 1964. (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Color vision, Tests), Ophthalmology, Medical examination, Reliability, Air force personnel, Training.

Color vision tests subsequent to AFES were given to 409 airmen in basic training, first, in a regular mass testing situation at Area A and then, in a clinical testing situation at Area B of the Medical Processing Division, Lackland Air Force Base, Texas. The AOC 15-plate test was used to separate Normals from Defectives. The type of color vision present was determined by the anomaloscope. The test plates missed by each individual were recorded by plate numbers, and the scores were evaluated to determine the diagnostic value of the plates for identification of Protans and Deutans. The test plates were ranked by the Judd criterion and the Sloan-Green criterion in order to determine their individual diagnostic value in separating Normals from Defectives. The ranks were similar with both criteria. Then a comparison was made with the ranks found in the Farnsworth data. Several of the plates ranked similarly but the remainder showed differences, some of which were quite marked. An analysis of the diagnostic value of the test plates in classifying color Defectives showed that Plates No. 12, 16, 19, 20, 29, 41 and 42 were more diagnostic of Protans while Plates No. 8, 9, 14, 23, 24, 27 and 43 showed no significant diagnostic tendencies. It was observed that no plate tended to be any more diagnostic of Deutans than Protans. Plate configuration was thought to play a part in the statistically significant training or learning effect among color Normals. No comparable effect was found among color Defectives.

AD-617 518 Div. 16/3, 16/1
CFSTI Prices: HC$5.00 MF$1.00

Virginia Univ., Charlottesville. Biochemical Lab.
ERYTHROCYTE BIOCHEMISTRY.
Rept. for 1 Apr 64-30 Jun 65,
by Alfred Chanutin. 30 Jun 65, 159p
Grant DA MD49 193 64G133
Unclassified report

Descriptors: (*Erythrocytes, Biochemistry), (*Blood chemistry, Reviews), Enzymes, Aging(Physiology), Infants, Glutathione, Lipids, Nucleotides, Metabolism, Phosphates, Sodium, Potassium, Carbohydrates, Amino acids, Preservation, Glucose, Hemolysis, Blood cells.

A review is given of important advances in the following aspects of erythrocyte biochemistry: erythrocyte enzymes, in vivo aging, infant erythrocytes, glutathione, erythrocyte lipids, nucleotide metabolism, phosphate exchange, sodium and potassium transport, sugar transport, amino acid transport, erythrocyte preservation, glucose metabolism, hemolysis, erythrocyte components.

AD-617 569 Div. 16/3, 16/1
CFSTI Prices: HC$1.00 MF$0.50

Goteborg Univ. (Sweden).
BIOCHEMISTRY AND PHYSIOLOGY OF BRAIN DOPAMINE.
Final scientific rept.,
by A. Carlsson. 13 Mar 65, 10p
Grant AF EOAR64 30, Proj. 9777, Task 977701
AFOSR 65-0872
Unclassified report

Descriptors: (*Brain, Amines), Nerve cells, Retina, Biochemistry, Physiology, Sweden.

The major part of the brain dopamine, a catecholamine belonging to the monoamine family, occurs in neurons, whose cell bodies are located in the substantia nigra of

the brain stem. Their axons ascend in the internal capsule and terminate in the neostriatum. Dopamine is localized also to other neuronal systems in the brain and the retina. Evidence supporting the view that the brain monoamines serve as neurohumoral transmitters has been presented. The functions of the nigro-neostriatal and other dopamine containing pathways are under study, using a multidisciplinary approach. (Author)

AD-617 572 Div. 16/1
CFSTI Prices: HC$2.00 MF$0.50

Parma Univ., (Italy). Inst. of Human Physiology.
PHYSIOLOGY OF CENTRAL VISUAL PATHWAYS.
Final rept.,
by A. Arduini. 31 Dec 64, 30p
Grant AF EOAR64 38
AFOSR 65-0873

Unclassified report

Descriptors: (*Vision, Physiology), Retina, Adaptation(Physiology), Functions, Linear systems, Light, Stimulation, Illumination, Intensity, Nerve fibers, Barbiturates, Cats, Italy.

The lateral geniculate nucleus and the visual cortex are considered on the base of the linear systems theory. An attempt is made at determining their transfer functions in conditions of retinal dark adaptation and under stimulation with steady, diffuse, white light of different intensity. The experiments were conducted in cats under barbiturate anesthesia, by monitoring activity in the input and output fiber tracts to these structures with both micro- and gross-electrodes. (Author)

AD-617 576 Div. 16/2

Illinois Univ., Urbana. Dept. of Microbiology.
ISOLATION OF STRAINS OF BACILLUS STEAROTHERMOPHILUS WITH ALTERED REQUIREMENTS FOR SPORE GERMINATION,
by L. Leon Campbell, Christina M. Richards, and Ester E. Sniff. 1965, 10p
Proj. NG108 330

Unclassified report

Pub. in Spores III p55-63 1965.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Spores, Bacillus), (*Bacillus, Spores), Mutations, Viability, Heat treatment, Temperature, Culture media.

It was shown that exposure at 121C for 12 min induced heritable changes in the spores of Bacillus stearothermophilus 1518-S. The mutants were shown to have altered requirements for spore germination. (Author)

AD-617 579 Div. 16/2

Pennsylvania State Univ., University Park. Dept. of Microbiology.
ABUNDANT MICROORGANISM IN SOIL,
by L. E. Casida, Jr. 2 Dec 64, 9p

Unclassified report

Pub. in Applied Microbiology v13 n3 p327-34 May 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Microorganisms, Soils), (*Soils, Microorganisms), Microbiology, Culture media, Growth, Morphology(Biology), Actinomycetaceae, Mycobacteriaceae, Fluorescence, Microscopy, Ultraviolet optical materials.

The presence in soil of large numbers of a catalase-negative, microaerophilic, coccoid microorganism was demonstrated. Use of media of high nutrient value, without incorporation of inhibitors, and growth in the absence of antagonistic microorganisms were utilized to isolate this organism from soil dilutions greater than those providing growth by other means. The organism described does not grow on soil extract agars and is missed by conventional counting techniques for soil organisms. On the basis of morphological and growth characteristics, this organism appears to have at least some taxonomic relationships to the families Actinomycetaceae and Mycobacteriaceae. It is proposed that this organism makes up much of the coccoid microflora of soil as observed by light and ultraviolet fluorescence microscopy. (Author)

AD-617 583 Div. 16/10

Toronto Univ. (Ontario). Dept. of Medical Biophysics.
RADIATION RESPONSES OF HEMOPOIETIC COLONY-FORMING CELLS DERIVED FROM DIFFERENT SOURCES,
by L. Siminovitch, J. E. Till, and E. A. McCulloch.
10 Aug 64, 13p
Grants DRB9350 14G, DRB9350 14C

Unclassified report

Pub. in Radiation Research v24 n3 p482-93
Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hemopoietic system, Radiation effects), (*Radiation effects, Hemopoietic system), Bone marrow, Spleen, Liver, Cells(Biology), Adults, Embryos, Transplantation, Radiological dosage, X rays, Gamma rays, Canada.

Hemopoietic colony-forming cells derived from adult femoral marrow, adult spleen, and fetal liver did not exhibit a uniform sensitivity to radiation when freshly explanted cells from these sources were tested in the same way for the survival of colony-forming ability after irradiation in vivo. The D sub 0 values and extrapolation numbers observed were: for adult femoral marrow, 95 ± 9 rads, 1.50 ± 0.54; for adult spleen, 90 ± 16 rads, 0.80 ± 0.46; for fetal liver, 146 ± 26 rads, 1.08 ± 0.50. Fourteen days after transplantation into X-irradiated (900 rads) hosts, hemopoietic colony-forming cells derived from femoral marrow, spleen, or fetal liver showed a relatively uniform, increased radiation sensitivity for cells proliferating in spleen or in marrow. The D sub 0 values and extrapolation numbers for cells proliferating in spleen were found to be: for cells derived originally from marrow, 69 ± 12 rads, 0.99 ± 0.42 for cells derived from spleen, 74 ± 15 rads, 0.77 ± 0.43; for cells derived from fetal liver, 80 ± 16 rads, 0.72 ± 0.42. For cells derived from fetal liver, the increase in radiation response took place during the first 6 days after transplantation of the cells into irradiated hosts. (Author)

AD-617 590 Div. 16/3

Presbyterian-St. Luke's Hospital, Chicago, Ill.
SELECTIVE INACTIVATION OF FIBRIN STABILIZING FACTOR CONTAMINANT IN FIBRINOGEN,
by Stevenson Swigert, J. L. Koppel, and John H. Olwin. 1962, 4p
Contract DA49 193MD2171; Grant NIH H3940

Unclassified report

Pub. in Nature v198 n4882 p797-8 May 25 1963.
(Copies available only to DDC users).

Descriptors: (*Fibrin, Blood coagulation), (*Fibrinogen, Quantitative analysis), Enzymes, Blood proteins, Stabilization, Labeled substances, Preparation.

The finding that mercaptide-forming agents inactivate Fibrin Stabilizing Factor (FSF) present in fluorescein-labelled human or bovine fibrinogen preparations led to the development of a combined procedure in which both FSF inactivation and fibrinogen labelling with fluorescein are carried out simultaneously. This combined procedure makes possible the rapid and reproducible preparation of a labelled fibrinogen product suitable for use in an assay system for the quantitative measurement of FSF activity. It is the purpose of this paper to describe: (a) the procedure used for the preparation of such tagged, treated fibrinogen; (b) some of the characteristics of the latter; (c) its application to the assay of FSF activity.

AD-617 591 Div. 16/15, 16/1, 16/12

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
STIMULUS CODING IN THE AUDITORY NERVE AND COCHLEAR NUCLEUS,
by Nelson Yuan-sheng Kiang. 1963, 16p
Contract DA36 039AMC03200; Grant NSF GP2495
Unclassified report

Pub. in Acta Oto-Laryngologica 59 p186-200 (Copies available only to DDC users). Prepared in cooperation with Massachusetts Eye and Ear Infirmary, Boston.

Descriptors: (*Auditory nerve, Reflexes), (*Hearing, Auditory nerve), Ear, Nuclei(Biology), Coding, Nerve fibers, Thresholds(Physiology), Cats.

The average time pattern of response of any auditory nerve fiber to simple acoustic stimuli is predictable from its 'tuning curve' and rate of spontaneous discharge. In contrast units in the cochlear nucleus may exhibit radically different response patterns to the same stimulus through their tuning curves and rates of spontaneous discharge are virtually identical. Messages carried by the auditory nerve are apparently recoded in the cochlear nucleus in a number of different ways. Consequently the nucleus should not be considered merely as a relay station. (Author)

AD-617 592 Div. 16/10

Cambridge Univ. (England). Dept. of Pathology.
THE MIXED CONGLUTINATION REACTION,
by P. J. Lachmann, K. W. Sell, and R. L. Spooner.
4 May 64, 10p
Grants Nonr G00040 63, NIAMD5872,
Proj. NR105 300
Unclassified report

Pub. in Immunology v8 n4 p345-53 Apr 1965.
(Copies available only to DDC users).

Descriptors: (*Immunology, Antigen-antibody reactions), (*Antigen-antibody reactions, Immune serums), Immunity, Tissue culture, Antigens + antibodies, Cells(Biology), Complement, Mice, Guinea pigs, Great Britain.

The technique of mixed conglutination-a mixed aggregation technique for the detection of complement fixing antibodies to antigens on cell surfaces-is described. The immune systems to which this technique has been applied include: (a) The detection of H-2 antibodies in mouse. (b) The detection of organ specific iso-antibodies in the mouse. (c) The detection of Forssman antigen on a continuous tissue culture line of dog cells using an immune anti-Forssman serum. (d) The detection of an auto-antibody-like factor occurring in normal guinea-pigs reacting with their own testicular tissue. (Author)

AD-617 601 Div. 16/10
CFSTI Prices: HC$2.00 MF$0.50

Brooke Army Medical Center, Fort Sam Houston, Tex.
CHROMOSOMAL DAMAGE IN HUMANS PRODUCED BY X-IRRADIATION.
Annual progress rept.,
by Jose M. Louro. 1964, 44p
Unclassified report

Descriptors: (*Chromosomes, Radiation effects), (*Radiation effects, Chromosomes), X rays, Anomalies, Leukocytes, Tissue culture cells, Morphology(Biology), Numbers, Pathology, Test methods, Tables.

The report covers the first year of a three year study of the effects of x-irradiation on the chromosomes of human subjects. The purpose of this study is to determine if chromosomal damage can be used as a means of estimating the amount of irradiation a person has received. The three year study is divided into three periods: I. Analysis of spontaneous chromosomal damage and aberrations occurring in normal, non-irradiated human subjects. II. Analysis of chromosomal aberrations in human subjects receiving large amounts of x-irradiation. III. Evaluation of chromosomal aberrations as a dosimeter in human subjects receiving serial x-irradiation.

AD-617 623 Div. 16/4

Queen Mary Coll., Univ. of London (England).
THE PHOTOMETABOLISM OF GLUCOSE IN CHLORELLA,
by C. P. Whittingham, Margaret Bermingham, and R. G. Hiller. 1963, 6p
Grant AF EOAR62 24
AFOSR 65-0946
Unclassified report

Pub. in Zeitschrift Fur Naturforschung v18 n9 p701-6 1963 (Copies available only to DDC users).

Descriptors: (*Photosynthesis, Algae), (*Algae, Metabolism), (*Glucose, Metabolism), Carbon dioxide, Radioactivity, Labeled substances, Oxygen, Sucrose, Isoniazid, Light, Saccharide phosphates, Great Britain.

Uniformly labelled radioactive glucose was fed to Chlorella cells in the presence of non-radioactive carbon dioxide. The concentration of carbon dioxide was varied and the distribution of radioactivity determined in the light. At low concentrations of carbon dioxide much of the radioactivity appeared in glycollate or derivatives thereform. By contrast, at higher concentrations of carbon dioxide, most of the radioactivity appeared in sucrose. If the concentration of oxygen was increased above that normally present in air, there was relatively more activity in glycollate. The effect of the addition of isoniazid in these conditions was also investigated. It was concluded that glucose fed to Chlorella exogenously is metabolised in the light in Chlorella via sugar phosphate intermediates of the Calvin cycle. (Author)

AD-617 629 Div. 16/13

Denver General Hospital, Colo.
POSTSYSTOLIC MYOCARDIAL AUGMENTATION, CLINICAL APPLICATIONS UTILIZING THE PRESSURE

PULSE GENERATOR,
by David H. Watkins and Phillip B. Callaghan.
1964, 11p
Grant DA MD49 193 65G143

Unclassified report

Pub. in Archives Surgery v90 p544-53 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Heart, Mechanical organs), (*Pulse generators, Medical equipment), Pulse rate, Surgery, Shock(Pathology), Hemorrhage, Blood volume, Blood pressure, Cardiovascular diseases, Pathology, Computers, Electrocardiography, Therapy.

With a new computer-automated, properly phased, hydraulically actuated pressure pulse generator capable of developing very fast response times, the technique of postsystolic myocardial augmentation has been applied to clinical cases which fall into two classes at the present time, namely (a) coronary shock, and (b) operative hemorrhagic shock particularly in the poor risk patients. Cases in the first category were selected on the basis of no response to pressor agents and oxygen, and rapid downhill course on present day therapy, while those in the second category consisted of patients whose general condition precluded therapy which they would otherwise require. The second category contained patients whose general condition precluded operative therapy and yet operative intervention was indicated. All these were successfully handled throughout surgery by means of postsystolic myocardial augmentation. (Author)

AD-617 637 Div. 16/3, 16/4, 4/4

Queen Mary Coll., Univ. of London (England). Dept. of Botany.
THE SYNTHESIS OF AMINO-ACIDS IN CHLORELLA IN LIGHT AND DARK. I. PHOTOSYNTHETIC PRODUCTS IN CHLORELLA,
by R. G. Hiller and C. P. Whittingham. 13 Mar 63, 9p
Grant AF EOAR62 24, Proj. 9777, Task 977701
AFOSR 65-0947

Unclassified report

Pub. in Journal of Experimental Botany v15 n43 p21-8 Feb 1964 (Copies available only to DDC users).

Descriptors: (*Algae, Photosynthesis), (*Amino acids, Photosynthesis), (*Photosynthesis, Amino acids), Biosynthesis, Labelled substances, Carbon dioxide, Glucose, Glutamic acid, Aspartic acid, Ammonium compounds, Chlorides, Great Britain.

Experiments with Chlorella show that glycine and serine both become radioactive during photosynthetic incorporation of radioactive carbon dioxide. By contrast, when radioactive glucose is fed to Chlorella in the dark, alanine, glutamate, and aspartate are the major products. These are not produced in significant amount during photosynthesis at low concentrations of carbon dioxide but their formation may be stimulated by the addition of ammonium ions. (Author)

AD-617 639 Div. 16/4

Queen Mary Coll., Univ. of London (England).
THE PRODUCTION OF GLYCOLLATE DURING PHOTOSYNTHESIS,
by C. P. Whittingham, R. G. Hiller, and M. Bermingham. 1963, 10p
Grant AF EOAR62 24, Proj. 9777, Task 977701
AFOSR 65-0950 Unclassified report

Pub. in Photosynthesis Mechanisms in Green Plants pub. n1145 p675-83 1963 (Copies available only to DDC users).

Descriptors: (*Photosynthesis, Algae), (*Algae, Photosynthesis), Metabolism, Amino acids, Gylcols, Sucrose, Radiobiology, Labeled substances, Carbon dioxide.

The products of photosynthesis in Chlorella have been investigated over a range of concentrations of CO2 above and below that in air. At low CO2 concentrations, a large fraction of CO2 fixed in photosynthesis is converted to glycolic acid, and to the amino acids glycine and serine. As the CO2 concentration increases, the production of glycolic acid and glycine decreases and sucrose becomes the major product. Other compounds, e.g., alanine, malic, and aspartic acids, are not markedly affected by changing the CO2 concentration within the range studied, and represent a relatively small fraction of the total carbon fixed. (Author)

AD-617 690 Div. 16/10
CFSTI Prices: HC$2.00 MF$0.50

Cambridge Univ. (England). Dept. of Pathology.
DETECTION OF TISSUE SPECIFIC ANTIGENS ON CELL SURFACES.
Final rept.,
by K. W. Sell. 15 Jun 65, 32p
Grant Nonr G00062 64, Proj. NR105 300

Unclassified report

Descriptors: (*Antigens + antibodies, Cells(Biology)), (*Transplantation, Antigen-antibody reactions), (*Antigen-antibody reactions, Tissues(Biology)), Immunology, Immune serums, Globulines, Sensitivity, Tissue culture cells, Erythrocytes, Hemolysis, Complement, Great Britain.

Antibody sensitization and complement dependent properties of IgG (7S) IgM (19S) rabbit anti-horse kidney (Forssman) antibodies were studied in systems using sheep erythrocytes and dog kidney tissue culture cells. Agglutination, indirect antiglobulin, and mixed antiglobulin techniques were used to determine the extent of antibody sensitization of cells. Immune adherence and mixed conglutination were used to demonstrate the presence of sites of complement fixation on these sensitized cells. The relationship between the presence of fixed complement and subsequent lysis of the test cells was examined. Guinea pig complement appeared to be less well fixed by IgG than IgM antibodies. However the complement fixed by IgG antibody was shown to be highly lytic both for sheep erythrocytes and dog kidney tissue culture cells. The fixation of complement by IgM antibodies resulted in weak and relatively ineffective cytolysis of dog kidney cells while retaining its lytic activity on sensitised sheep erythrocytes. (Author)

AD-617 691 Div. 16/11
CFSTI Prices: HC$2.00 MF$0.50

Hine Labs., Inc., San Francisco, Calif.
THE SIMILAR PHARMACOLOGIC AND TOXIC EFFECTS OF PENTABORANE, DECABORANE, AND RESERPINE.
Final rept. for Sep 63-Sep 64,
by Francis W. Weir, Frederick H. Meyers, Robert H. Arbuckle, and Swanson Bennett. May 65, 26p
Contract AF33 657 11756, Proj. 6302, Task 630202
AMRL TR-65-49

Unclassified report

Descriptors: (*Pentaboranes, Toxicity), (*Deca-

boranes, Toxicity), (*Reserpine, Toxicity), Pharmacology, Levarterenol, Serotonin, Cardiovascular diseases, Pathology, Convulsive disorders, Rodents, Dogs.

The investigation was conducted to establish the mechanism of toxic action of pentaborane (B5H9) and decaborane (B10H14) preliminary to the study of possible therapeutic or protective agents. The pharmacological effects of pentaborane and decaborane on mice, rats, and dogs were studied and compared to the pharmacological effects of reserpine. The compounds were administered intraperitoneally; pentaborane was also administered by the inhalation route. Conscious dogs showed signs of limitation of sympathetic activity, evidenced by miosis, nictitating membrane relaxation, bradycardia, dilation of superficial vessels, and sedation with easy arousal. Anesthetized dogs showed an initial rise in blood pressure followed by hypotension, bradycardia, and decreased response to tyramine. Reversal of some of these effects occurred following norepinephrine infusions. Spectrofluorometric analyses of the brains of groups of rats administered any of the three compounds demonstrated depletion of serotonin and norepinephrine. Pentaborane is comparatively more active in producing excitement and convulsions. The boranes closely resemble reserpine in their effects but have a shorter duration of action. (Author)

AD-617 692 Div. 16/11
CFSTI Prices: HC$1.00 MF$0.50

Hine Labs., Inc., San Francisco, Calif.
FURTHER STUDY OF THE MECHANISM OF ACUTE TOXIC EFFECTS OF 1,1-DIMETHYLHYDRAZINE.
Final rept. for Sep 63-Sep 64,
by Francis W. Weir, Frederick H. Meyers, Robert H. Arbuckle, and Jesus H. Nemenzo. May 65, 24p
Contract AF33 657 11756, Proj. 6302, Task 630202
AMRL TR-65-48 Unclassified report

Descriptors: (*Dimethyl hydrazine(1-1), Toxicity), (*Methyl hydrazines, Toxicity), Pharmacology, Pathology, Convulsive disorders, Rodents, Dogs, Tables.

Investigations were designed to explore mechanisms of toxic action of SDMH, UDMH, and MMH. SDMH is more toxic when administered in strongly acid (less than pH 1.0) or alkaline (pH 11.0) solutions than when administered in buffered solutions. The acute toxicity to mice of unbuffered SDMH-dihydrochloride is not different from hydrochloric acid. The tenfold difference between the acute toxicity of SDMH at 24 and 168 hours for mice is not seen in rats or dogs. The degree and time course of liver damage in mice is such that it is probably responsible for the delayed deaths seen in this species. The previously reported selective protective action of various substituted benzaldehydes against UDMH and MMH in mice was not observed in rats. Prophylactic treatment with amino-oxyacetic acid provided protection to rats against the lethal effects of UDMH, but not against the effects of MMH. The mechanism and site of action of UDMH (1,1-dimethylhydrazine), MMH (methylhydrazine), and SDMH (1,2-dimethylhydrazine) were investigated. Discrete localized lesions produced in specific areas of the otherwise intact brain stem by suction or electrolytic destruction modify or abolish UDMH-induced convulsions in dogs. The area from which these convulsions arise has been localized to a ventral mid-collicular site. (Author)

AD-617 695 Div. 16/4
CFSTI Prices: HC$1.00 MF$0.50

Maryland Univ., College Park. Dept. of Zoology.
STUDIES ON LARVAL TROMBICULID MITES (CHIGGERS) FROM MALAYA AND BORNEO.
Progress rept. for 1 Jul 64-15 Feb 65,
by George Anastos. 15 Feb 65, 25p
Contract DA49 193MD2074
Unclassified report

Descriptors: (*Mites, Asia), Disease vectors, Rickettsia, Parasites, Mammals, Larvae, Virus diseases, Ecology, Siphonaptera, Pakistan, Borneo, Malaya, Thailand, Tables.

The major effort during the contract year was on investigations in Pakistan, undertaken as a colloborative project ancillary to studies on viral and rickettsial infections in Asia. It is pointed out that preliminary observations in 1962, based upon a study of trombiculid mites and their hosts in parts of West Pakistan, indicated that scrub typhus may be present in highly unusual types of terrain and in unexpected geographical areas. In 1963 it was shown that such indeed was the case and isolations of scrub typhus rickettsiae (R. orientalis) were made from tissues of Rattus from the plains of Lahore and elsewhere in that District, where established vector chiggers, such as Leptotrombidium deliensis, have never been found, but where related species, new to Science, do occur. Likewise in 1963 it was demonstrated that natural infection with Rickettsia orientalis occurred in Rattus rattoides and in Apodemus flavicollis (a field mouse) in the Kaghan Valley of the Himalayas at 8000 feet elevation, where snow is present on the ground eight months of the year. The 1964 program verified and extended the above observations, and it appears that scrub typhus may be endemic in a vast area that had been assumed to be free of infection, and that it may occur in desert regions, and in alpine or artic-alpine zones in the Himalayas. A minimum of 54 species of trombiculid mites were collected in Pakistan, including at least ten that are apparently new to science, are discussed. The mammal-hosts and their habitats are considered.

AD-617 700 Div. 16/1, 16/3
CFSTI Prices: HC$3.00 MF$0.75

University Coll., Dublin (Eire). Unit of Cell Metabolism.
ACTIVE TRANSPORT OF IONS.
Final rept.,
by Edward J. Conway. 27 Jan 65, 55p
Contract AF61 052 435, Proj. 9777, Task 977701
AFOSR 65-0871
Unclassified report

Descriptors: (*Electrolytes(Physiology), Transport properties), (*Membranes(Biology), Transport properties), (*Cells(Biology), Transport properties), Sodium, Ions, Secretion, Oxidation-reduction reactions, Osmosis, Hydrogen, Excretion, Adenosine phosphates, Muscles, Yeasts, Nitrophenols, Acetates, Enzymes, Feedback, Dyes, Diffusion, Body fluids, Eire.

The interpretation given to active transport of ions is their movement from a lower to a higher chemical or electrochemical potential, work being done in the process. This process can be represented as occuring in stages: (a) Firstly the ion attaches itself to a carrier. This attachment involves electrical adsorption to an ion or ions of opposite charge. Also, in order to enter into or cross membrane barriers the complex of ion and carrier may be assumed to be lipoid soluble. (b) The ions are released from their attachment to the complex by the release in some way of the electric charges attaching to the carrier ions. (c) This may be considered as accomplished by the activity of the redox pump or alternatively

by some special action of an ATPase enzyme, the process occurring in a cyclical manner, and involving the input of free energy. (Author)

AD-617 713 Div. 16/4
CFSTI Prices: HC$4.00 MF$1.00

Pacific Science Board, National Research Council, Washington, D. C.
ATOLL RESEARCH BULLETIN, NOS. 109-112, by Richard G. Buggeln, Roy T. Tsuda and John D. Milliman. 15 Jul 65, 130p
Contract Nonr230012

Unclassified report

Contents: A preliminary list of the algal flora of the Midway Islands; Marine Algae from Laysan Island with additional notes on the vascular flora; An annotated bibliography of recent papers on corals and coral reefs; Atoll News and Comment.

Descriptors: (*Plants(Botany), Midway), (*Marine biology, Midway), Algae, Coral reefs, Marine geology, Sedimentation, Ecology, Aquatic animals, Invertebrates, Pacific Ocean, Marine geophysics, Oceanology, Bibliographies, Abstracting.

AD-617 730 Div. 29/2

National Academy of Sciences - National Research Council, Washington, D. C.
RADIATION PRESERVATION OF FOODS. PROCEEDINGS OF AN INTERNATIONAL CONFERENCE, BOSTON, MASSACHUSETTS SEPTEMBER 27-30, 1964.
1965, 434p Pub. no. 1273

Unclassified report

For DDC users only. Available through the Printing and Publishing Office, NAS-NRC, Washington, D. C. 20418, $9.00.

Descriptors: (*Irradiated foods, Symposia), (*Food, Preservation), Fruits, Vegetables, Meat, Fishes, Birds, Wheat, Gamma rays, Isotopes, Radiation effects, Radiological dosage, Dosimeters, Electron accelerators, Microbiology, Enterobacteriaceae, Food poisoning, Clostridium botulinum, Salmonella, Pasteurization, Biochemistry, Research program administration, Packaging.

Contents: Technological aspects of the radiation preservation and sterilization of foods: World-wide status of the treatment of foods by ionizing energy; Need for international cooperation; Work of the OECD's European Nuclear Energy Agency (ENEA) in food irradiation; Prospects for radiation preservation of foods in Britain; European radiation preservation of fruits and vegetables; Irradiation of fruits and vegetables; Radiation preservation of fish and shellfish of the Northeast Pacific and Gulf of Mexico; Radiation preservation of fish of the northwest Atlantic and the Great Lakes; Radiation Preservation of ham and other cured meats; Radiation preservation of fresh meat and poultry; Packaging aspects of radiation preservation of foods; Troop-acceptance testing of irradiated foods; Chemical changes in irradiated meats; Sprout inhibition of vegetables using gamma radiation. Source facilities and technology: Isotopic sources; Electron accelerators for food processing. Wholesomeness and food legislation: Data on wholesomeness studies; Wholesomeness considerations in radiation preservation of foods; Aspects of food legislation in Canada relative to wholesomeness; Some international aspects of wholesomeness of irradiated foods. Microbiological aspects of irradiation preservation of foods: Potential problems of Type-E Botulism in radiation-preserved seafoods.

AD-617 741 Div. 16/1
CFSTI Prices: HC$1.00 MF$0.50

Milan Univ. (Italy). Istituto di Fisiologia Umana.
DIAPHRAGM ACTIVITY AND THORACOABDOMINAL MECHANICS DURING POSITIVE PRESSURE BREATHING.
Final rept. for 1 Feb 62-1 Feb 63, by Emilio Agostoni. Dec 64, 19p
Grant AF EOAR62 95, Proj. 7163, Task 716301
AMRL TR-64-141

Unclassified report

Descriptors: (*Pressure breathing, Physiology), Diaphragms(Anatomy), Thorax, Abdomen, Pressure, Lungs, Muscles, Respiration, Italy.

The electrical activity of the diaphragm and the mechanical contribution of the thorax and the abdomen through the breathing cycle were investigated in man during positive pressure breathing (PPB). The electrical activity of the diaphragm persists even at values at which inspiration should be completely passive according to the pressure volume diagram of the thorax and lung. The transdiaphragmatic pressure decreases as the value of PPB increases, but is still appreciable at values of PPB at which the inspiration appears to be completely passive by an analysis based on transthoracic pressure measurements alone. The transdiaphragmatic pressure becomes zero only at a PPB of about 30 cm. water. The persistent activity of the diaphragm during PPB is counterbalanced by an activity of the abdominal muscles in excess of that of the expiratory muscles as given by transthoracic pressure measurements. Owing to the persistence of a thoracoabdominal pressure gradient the venous return, and therefore the cardiac output, should be less reduced than in the case of a passive inspiration. The activity of the abdominal muscles is not necessarily initiated by the respiratory control system. Similarly, during PPB, the activity of the abdominal muscles could be a tonic reflex against the background of which the diaphragm behaves in its usual way. The electrical activity of the diaphragm during breath holding was studied. After a period of no, or only slight, tonic activity a marked discharge was recorded; this was followed by others at a progressively higher rate up to the breaking point. The action of the diaphragm, not balanced by antagonist muscles, caused a fall of the intrathoracic pressure.

AD-617 752 Div. 16/1, 28/3
CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
CHANGES IN SPONTANEOUS ACTIVITY AS A MEASURE OF SENSITIVITY TO ROTATION IN THE WHITE RAT, by Arnold Eskin and David C. Riccio. 11 Jan 65, 13p Rept. no. NSAM-913
Proj. MR005 13 6001, Task 1
NAVMED MR005.13-6001.1-103

Unclassified report

Joint rept. with National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Rotation, Sensitivity), (*Acceleration tolerance, Rats), Behavior, Motion, Vestibular apparatus, Stimulation, Psychophysiology, Aviation medicine, Stress(Physiology).

Fifty-six unrestrained rats were individually exposed to a rotation speed between 0-18 RPM. Their activity was measured using a fourpoint scale: (0) no activity, (1) grooming and sniffing, (2) moderate running, and (3) rapid running. Amount of activity decreased as a function of rotation speed from 6 to 14 RPM, where it reached a lower limit plateau. Rate of decline within this speed range was

also directly related to velocity. Postrotation activity was suppressed up to five minutes. The rats showed considerable sensitivity to Coriolis stimuli generated during constant speed of rotation. A relationship was found between duration and magnitude of stimulation. These findings are encouraging for the use of behavioral methods in studying sensitivity to motion. (Author)

AD-617 753 Div. 16/1, 28/3
CFSTI Prices: HC$2.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
A NEW QUANTITATIVE ATAXIA TEST BATTERY,
by Ashton Graybiel and Alfred R. Fregly.
19 Mar 65, 41p Rept. no. NSAM-919
Proj. MR005 13 6001, Task 1
NAVMED MR005.13-6001.1-107

Unclassified report

Joint rept. with National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Psychomotor tests, Posture), (*Posture, Psychomotor tests), Musculoskeletal system, Diseases, Performance tests, Stress(Physiology), Rotation, Vestibular apparatus, Psychophysiology, Motion sickness, Aviation medicine, Reliability, Males, Females, Adaptation(Physiology).

A new multi-dimensional quantitative ataxia test battery employing the 'rail method' of testing was developed to assess more precisely than heretofore postural equilibrium-disequilibrium under unusual conditions and stresses such as rotating environments. High reliability, including test-retest reliability, was demonstrated for each of two versions: a Long Version employing six rails of varying widths, and a Short Version employing two of these rails. Normative standards covering a wide age range, and age, height, and weight influences upon performance, tentative sex differences in performance, practice effects, and Test Battery relationships with several clinical-type ataxia tests were determined. Validity of the standardized test procedures in the laboratory, in the field, and in clinical situations was demonstrated, and present and future uses of the Test Battery in normals and auricular-involved individuals in vestibular research as well as in related research-clinical areas were outlined, and several methodological limitations were indicated. (Author)

AD-617 754 Div. 16/1, 28/3
CFSTI Prices: HC$2.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
COMPARATIVE EFFECTS OF PROLONGED ROTATION AT 10 RPM ON POSTURAL EQUILIBRIUM IN VESTIBULAR NORMAL AND VESTIBULAR DEFECTIVE HUMAN SUBJECTS,
by Alfred R. Fregly and Robert S. Kennedy.
23 Mar 65, 24p Rept. no. NSAM-920
Proj. MR005 13 6001, Task 1
NAVMED MR005.13-6001.1-108

Unclassified report

Joint rept. with National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Vestibular apparatus, Rotation), (*Posture, Psychomotor tests), (*Psychomotor tests, Posture), Performance tests, Musculoskeletal system, Diseases, Adaptation(Physiology), Stress-(Physiology), Psychophysiology, Aviation medicine.

As a means of better understanding the role of the vestibular organs in relation to ataxic responses to prolonged rotation, two contrasting groups of subjects were studied to: 1) determine quantitatively to what extent two visually-enhanced postural equilibrium test performances of labyrinthine defective subjects (L-D's) on a single rail of optimum difficulty become disturbed along the time axis of rotation (Experiment A), and 2) compare the performances of L-D's with normals in terms of postrotation effects as studied with a new standarized ataxia test battery (Experiment B). Rotation-induced ataxia was superimposed to an appreciable extend upon the previously present and characteristic vestibular ataxia in the L-D's (Exp. A), and (in Exp. B), upon cessation, there were significant decrements on all Test Battery performances of the normal group, whereas in the L-D group significant decrements were observed only on the two visually-enhanced tests. Other findings, which were considered tentative, are discussed in terms of several unresolved methodological problems in such experiments. (Author)

AD-617 755 Div. 16/11, 16/1
CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
EVALUATION OF SOME ANTIMOTION SICKNESS DRUGS ON THE SLOW ROTATION ROOM (NO. 1),
by Charles D. Wood, Ashton Graybiel, Robert G. McDonough, and Robert S. Kennedy. 29 Mar 65, 14p
Rept. no. NSAM-922
Proj. MR005 13 6001, Task 1
NAVMED MR005.13-6001.1-110

Unclassified report

Joint rept. with National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Motion sickness, Drugs), Pharmacology, Rotation, Acceleration tolerance, Stress(Physiology), Scopolamine, Amphetamines, Chlorpromazine, Vertigo, Centrifuges, Humans, Aviation medicine.

A series of antimotion sickness drugs was evaluated on the human centrifuge at the Navy School of Aviation Medicine. The procedures used enabled the same stimulus to be applied to the individual subjects through the series of drug tests. A combination of hyoscine and d-amphetamine was found to be the most effective preparation. Hyoscine alone was the most effective single drug followed by d-amphetamine and meclizine Prochlorperazine was slightly effective, but chlorpromazine, thiethylperazine, and trimethobenzamide were ineffective. Hyoscine alone produced pronounced drowsiness. The combination with d-amphetamine relieved this side effect but not the vertigo and dry mouth. The advantages of the human centrifuge in the testing of antimotion sickness drugs are pointed out. (Author)

AD-617 756 Div. 16/1, 28/3
CFSTI Prices: HC$3.00 MF$0.75

Naval School of Aviation Medicine, Pensacola, Fla.
THE EFFECTS OF EXPOSURE TO A ROTATING ENVIRONMENT (10RPM) ON FOUR AVIATORS FOR A PERIOD OF TWELVE DAYS,
by A. Graybiel, R. S. Kennedy, E. C. Knoblock, F. E. Guedry, Jr., and W. Mertz. 30 Mar 65, 68p
Rept. no. NSAM-923
Proj. MR005 13 6001, Task 1
NAVMED MR005.13-6001.1-111

Unclassified report

Joint rept. with National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Rotation, Tolerances(Physiology)), Military personnel, Adaptation(Physiology), Psychophysiology, Countermeasures, Performance tests,

Vestibular apparatus, Central nervous system, Acceleration tolerance, Biochemistry, Cardiovascular system, Motion sickness, Visual acuity, Stress(Physiology), Musculoskeletal system, Diseases, Space perception, Posture, Gravity, Medical examination, Space medicine.

Four carefully selected military personnel undergoing flight training were exposed to constant rotation at a speed of 10 RPM for 12 days in the Pensacola Slow Rotation Room. Environmental and working conditions simulated in many respects those which might obtain in a rotating orbiting spacecraft. The findings are discussed under three headings: clinical symptoms, clinical laboratory findings, and psychophysiological performance. The experiment has demonstrated that countermeasured in addition to adaptation are needed if there is immediate exposure to rotational velocities of 10 RPM and that the rotating room is a useful device for further exploration of vestibular and central nervous system mechanisms. (Author)

AD-617 794 Div. 16/11, 16/1
CFSTI Prices: HC$1.00 MF$0.50

Milan Univ. (Italy).
ACTION OF CURARE-LIKE DRUGS ON SHORT AND LONG NEURONAL CIRCUITS,
by D. Spinelli, T. Gualtierotti, D. Passerini, and R. Margaria. 1958, 1p
Contract AF61 052 23
AFOSR TN-59-1008

Unclassified report

Descriptors: (*Curare alkaloids, Nerve cells), Nerve impulses, Reflexes, Cerebral cortex, Spinal cord, Vestibular apparatus, Stimulation, Drugs, Parenteral infusions, Inhibition, Cats, Italy.

A curare-like non hyperpolarizing drug, such as succinylcholine, seems to produce an overall facilitation on the nervous centers, involving especially long neuron 1 circuits (polysynaptic spinal reflex activity, rotary afterdischarges of the cerebellar cortex). On the oligosynaptic arc the facilitatory effect was limited to the very beginning of the administration of the drug, being followed later by inhibition. A hyperpolarizing cucare drug, on the contrary, seems to induce a suppressory action on long interneuronal circuits such as those involved in the response of the cerebellar activity to a gravitational stimulation of the labyrinth. The increase of spinal reflex responses induced in a first time by this drug, seems to contradict the preceding statement; such an effect, however, may be due to a more marked blocking effect on the Renshaw inhibitory cells; the Renshaw antidromic inhibition is in fact substantially decreased under the action of this drug. (Author)

AD-617 795 Div. 16/1
CFSTI Prices: HC$1.00 MF$0.50

Milan Univ. (Italy).
ROLE OF RENSHAW ANTIDROMIC INHIBITION ON THE EFFERENT ACTIVITY OF THE SPINAL CORD IN MAN,
by R. Margaria, T. Gualtierotti, and D. Spinelli.
1957, 1p
Contract AF61 052 23
AFOSR TN-59-1009

Unclassified report

Descriptors: (*Spinal cord, Reflexes), Muscles, Contraction, Nerve cells, Nerve fibers, Inhibition, Italy.

The function of Renshaw antidromic inhibition in the activity of the spinal centers was investigated. It is suggested that there is a link between the rhythm of discharge of the single motoneurons of the spinal cord, the silent period in the muscle and the Renshaw antidromic inhibition. This last is presumably the main controlling mechanism for the efferent activity of the spinal centers, and it seems responsible for their low frequency of discharge.

AD-617 796 Div. 16/1, 16/11
CFSTI Prices: HC$1.00 MF$0.50

Brussels Univ. (Belgium).
NEUROPHYSIOLOGIC CORRELATES OF SENSORY PERCEPTION.
Final scientific rept. for 1 Feb 64-31 Jan 65,
by John E. Desmedt. 28 Feb 65, 6p
Grant AF EOAR64 43
AFOSR 65-0874

Unclassified report

Descriptors: (*Sensory perception, Nervous system), Physiology, Auditory perception, Nerve cells, Drugs, Hearing, Pathology, Hypothermia, Pharmacology, Alkaloids, Cerebral cortex, Psychophysiology, Humans, Cats, Pigeons, Belgium.

The functional capabilities and mode of operation of several parts of the feedback neural circuit related to acoustic sensory processing were investigated in acute experiments carried out chiefly in cats and pigeons. The limited potency of efferent gating of acoustic input in pigeon has been confirmed and substantiated. Quantitative evidence was obtained on the functional differences of these systems in cat and pigeon. These differences were related to the peculiar features of the fine structural organization of the corresponding synapses in the inner ear. Electrical signs of activity in efferent olivo-cochlear system was obtained in congenital deaf albino cat. The effect of hypothermia on the operation of the feedback system was analysed in the cat and a temperature coefficient was determined for the dissipation kinetics. Neuropharmacological studies were also carried out. It was found a.o. that the alcaloid coniine antagonizes the efferent inhibitory process but in a way unlike that of the alcaloid strychnine. Somatosensory and acoustic evoked potentials were recorded from the scalp in normal man with a Mnemotron digital computer, and their features were correlated with psychophysical data obtained for the same stimuli, with particular reference to the signal detection capabilities of the human operator. (Author)

AD-617 802 Div. 16/2

Cincinnati Univ., Ohio. Dept. of Microbiology.
REPRESSION OF TRYPTOPHANASE SYNTHESIS IN ESCHERICHIA COLI,
by William H. Beggs and Herman C. Lichstein.
18 Nov 64, 9p
Grant NSF G19578, Proj. NR103 555

Unclassified report

Pub. in Journal of Bacteriology v89 n4 p996-1004 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Escherichia coli, Enzymes), (*Enzymes, Synthesis), (*Glucose, Metabolism), Tryptophan, Growth, Amino acids, Culture media, Casein, Inhibition.

The nature of the flucose effect on tryptophanase in Escherichia coli (Crookes) was investigated to test the catabolite-repression hypothesis. Under static conditions of growth in the presence of 0.005 M glucose, trypotophanase was repressed and remained so upon continued static incubation subsequent to glucose exhaustion. Aeration following glucose exhaustion under static

cultural conditions resulted in rapid enzyme synthesis. In the absence of glucose, certain amino acids repressed tryptophanase synthesis early in the growth cycle under aerated conditions. An inverse relationship was observed between the concentration of acid-hydrolyzed casein and the level of tryptophanase. At 3 hr, enzyme activity in cells grown in media containing 0.005% acid-hydrolyzed casein was at least five times that of cells grown in the presence of 1% casein. Addition of 0.005 M D- or L-serine to a 0.05% acid-hydrolyzed casein medium rendered the medium capable of strongly repressing tryptophanase. Glucose-expended medium was prepared by allowing cells to grow and exhaust glucose in static culture. When this expended medium was recovered and inoculated with fresh cells not previously exposed to glucose, tryptophanase synthesis was repressed for a short period in shake culture, but in static culture enzyme synthesis was only slightly affected. When the expended medium was prepared from shake cultures, fresh cells were not repressed strongly when subsequent incubation was carried out aerobically. The tryptophan pool in glucose-repressed cells grown in shake culture was appreciably less than in cells grown in the absence of glucose or in cells undergoing synthesis of tryptophanase after exhaustion of the sugar. (Author)

AD-617 803 Div. 16/2

Cincinnati Univ., Ohio. Dept. of Microbiology.
CONVERSION OF D-BIOTIN TO BIOTIN VITAMERS BY LACTOBACILLUS ARABINOSUS,
by Jerome Birnbaum and Herman C. Lichstein.
27 Nov 64, 6p
Grant NSF G19578, Proj. NR103 555
Unclassified report

Pub. in Journal of Bacteriology v89 n4 p1035-40 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lactobacillus, Vitamin B complex), (*Vitamin B complex, Lactobacillus), Saccharomyces, Enzymes, Culture media, Growth, Ph, Chromatographic analysis, Cells,(Biology).

Saccharomyces cerevisiae utilizes D-biotin, biotin sulfoxide, and several vitamers of biotin, whereas Lactobacillus arabinosus responds to biotin and biotin sulfoxide of the naturally occurring forms of the vitamin. The use of these organisms for differential assay permitted investigation into possible conversion of D-biotin to vitamers of biotin by cells of L. arabinosus. Cells were grown in modified Wright-Skeggs medium containing several levels of biotin. No differences were detected between the assays for free intracellular or bound biotin up to 48 hr of growth. However, at 15 to 16 hr, in media containing an excess of biotin, the lactobacillus assay value for menstruum biotin dropped markedly, whereas the yeast assay showed no change. This suggested that biotin was converted to vitamers not active for L. arabinosus. The biotin-converting system appears to have characteristics of an enzyme system, i.e., a temperature optimum at 37C, a broad pH optimum of 4.3 to 6.5, and requirements for Mg and Mn ions. Experiments suggest that increasing hydrogen ion concentration is a major physiological mechanism controlling the formation of this system. The vitamers were separated chromatographically and were found to have RsubF values of 0.44 and 0.94, and are combinable and uncombinable with avidin, respectively. The physiological role of biotin conversion is discussed in relation to control of cell populations in cultures of L. arabinosus. (Author)

AD-617 804 Div. 16/4, 15/2, 30/3

Johns Hopkins Univ., Baltimore, Md.
HAZARD ANALYSIS. I,
by G. S. Watson and M. R. Leadbetter.
1963, 10p
Unclassified report

Pub. in Biometrika v51 n1 and 2 p175-84 1964 (Copies available only to DDC users).

Descriptors: (*Hazards, Statistical analysis), Life span, Probability, Reliability, Failure(Mechanics), Distribution theory.

AD-617 809 Div. 16/1

Illinois Univ., Urbana. Biophysical Research Lab.
MUSCLE TWITCH TENSION: INFLUENCE OF ELECTRICAL STIMULATING CONDITIONS AT DIFFERENT TEMPERATURES. III. ANALYSIS AND CORRELATION,
by Elizabeth Kelly and William J. Fry.
11 Aug 64, 10p
Contract Nonr183420, Proj. NR101 075
Unclassified report

Pub. in Physics in Medicine and Biology v10 n2 p251-60 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Muscles, Contraction), Amphibians, Reflexes, Stimulation, Musculoskeletal system, Temperature, Acetylcholine.

Previous investigators have explained many of the effects induced by changes in both physical and chemical parameters on the amplitude of peak twitch tension as a direct consequence of changes in the duration of the active state. It is pointed out that recent experimental results indicate that the application of the active state concept to correlate earlier data on the variation of twitch tension with changes in temperature and chemical environment may now be open to question. A basis for correlating the data of a number of previous investigators on the amplitude of the single response of skeletal muscle under various conditions of stimulation with that of the present authors is presented. Arguments are formulated for the viewpoint that the acetylcholine coupling mechanism is not restricted to the endplate region. (Author)

AD-617 810 Div. 16/4

Queen Mary Coll., Univ. of London (England). Dept of Botany.
STUDIES WITH FLASH ILLUMINATION ON THE ENHANCEMENT EFFECT IN CHLOROPLASTS,
by C. P. Whittingham and P. M. Bishop.
1963, 11p
Grant AF EOAR62 24
AFOSR 65-0948
Unclassified report

Pub. in mono. Photosynthesis Mechanisms in Green Plants, Washington, D. C., 1963 p371-80, NAS-NRC Pub. no. 1145 (Copies available only to DDC users).

Descriptors: (*Photosynthesis, Illumination), Chlorophylls, Algae, Light, Monochromatic light, Background, Great Britain.

AD-617 811 Div. 16/1

University of Western Ontario. London. Dept. of Physiology.
A SEX DIFFERENCE IN THE TEMPERATURE RESPONSE OF RATS TO EXERCISE,
by G. E. Thompson and J. A. F. Stevenson.

26 Nov 64, 7p

Unclassified report

Research supported by Medical Research Council, London, England, and Defence Research Board, Ottawa, Ontario.
Pub. in Canadian Journal of Physiology and Pharmacology v43 p437-43 1965 (Copies available only to DDC users).

Descriptors: (*Exercise, Body temperature), (*Heat tolerance, Exercise), (*Body temperature, Rats), Sex, Sex glands, Ovaries, Progesterone, Testosterone, Excision, Tolerances(Physiology), Blood vessels, Males, Females.

The changes of colonic and tail skin temperatures were measured in male and female rats exercised on a motor-driven treadmill at a speed of 4.6m/minute. The pattern of changes in these temperatures was the same in the two sexes except that the females tolerated a significantly higher colonic temperature than the males before beginning to vasodilate in the tail, and, perhaps as a result, the females regulated core temperature at a significantly higher level as exercise continued. Ovariectomy or prolonged (7-14 days) treatment with progesterone (12 mg/day) resulted in the temperature response to exercise of the female approaching that of the male, but not entirely eliminating the difference. (Author)

AD-617 815 Div. 16/11, 16/1

Karolinska Inst., Stockholm (Sweden).
EFFECTS OF RESERPINE, SEGONTIN AND PHENOXYBENZAMINE ON THE CATECHOLAMINES AND ATP OF ISOLATED NERVE AND ADRENOMEDULLARY STORAGE GRANULES,
by U. S. von Euler, L. Stjarne, and F. Lishajko.
10 Dec 63, 9p
Grant AF AFOSR62 14, Proj. 9777, Task 977701
AFOSR 65-0944

Unclassified report

Pub. in Life Sciences v3 p35-40 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Amines, Pharmacology), (*Pharmacology, Amines), Reserpine, Adenosine phosphates, Adrenal glands, Granules, Tissues(Biology), Autonomic nervous system, Drugs, Sweden.

The effects of 3 compounds, reserpine, segontin, and phenoxybenzamine, are compared on the amine and ATP content of the catecholamine storage granules from adrenergic nerve and from adrenal medullary tissues. The inhibition of outflux from the nerve granules caused by reserpine applies selectively to the catecholamines, while the spontaneous loss of ATP is not affected. The effects of Segontin resemble those of reserpine. Phenoxybenzamine added to nerve storage granules maintains a high level of amines and ATP. Adrenal medullary granules incubated with this compound produce an opposite effect. At a somewhat higher concentration, phenoxybenzamine causes a considerable loss of both amines and ATP. (Author)

AD-617 816 Div. 16/13

Colorado Univ., Denver. Medical Center.
SPLENIC HOMOTRANSPLANTATION,
by Thomas L. Marchioro, David T. Rowlands, Jr., David Rifkind, William R. Waddell, and Thomas E. Starzl.
1963, 27p
Grants PHS A6283, PHS A6344 Unclassified report

Pub. in New York Academy of Sciences. Annals v120 article 1 p626-51 Nov 30 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Spleen, Transplantation), Immunity, Neoplasms, Cancer, Tissues(Biology), Surgical techniques, Whole body irradiation, Histology, Histological techniques, Gamma globulin, Pathology, Hemolysis, Erythrocytes, Hematocrit, Kidneys, Excision, Anemias, Dogs.

A series of canine splenic homografts was performed. Animals pretreated with total-body irradiation showed markedly shortened red cell half-life and sharp drops in hematocrit with no potentiation of homograft survival. Those dogs treated with azathioprine had no change in red cell half-life, hematocrit changes were much less than in the irradiated animals, and homograft survival was increased as judged by pathologic studies. In another series of animals, simultaneous renal and splenic homografts were performed to bilaterally nephrectomized dogs. Function of both transplanted organs was inferred from the behavior of the renal homograft. Control animals receiving no therapy showed a somewhat delayed rejection. Those dogs treated with total-body irradiation frequently developed severe hemolytic anemia and graft survival was less than in untreated animals. Both the spleen and the kidney appeared to be particularly susceptible to the rejection reaction in this series, and of the two organs, the spleen appeared to be more damaged than the kidney. When azathioprine was used as the immunosuppressive agent, survival of both renal and splenic homografts was obtained to as long as seven and one-half months. Anemia was not noted in these animals after the first month and gross and microscopic examination at seven months revealed both organs to be viable. (Author)

AD-617 819 Div. 16/1, 16/12

Sao Paulo Univ. (Brazil). School of Medicine of Riber-Ribeirao Preto.
EFFECTS OF STIMULATION OF THE SEPTAL AREA UPON BLOOD PRESSURE AND RESPIRATION IN THE CAT,
by Miguel R. Covian, Jose Antunes-Rodrigues and Juan J. O'Flaherty. 8 Oct 63, 16p
Grant AF AFOSR63 311

Unclassified report

Pub. in Journal of Neurophysiology v27 p394-407 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Brain, Stimulation), (*Blood pressure, Central nervous system), (*Respiration, Central nervous system), Cardiovascular system, Autonomic nervous system, Nerves, Nervous system, Physiology, Spinal cord, Excision, Drugs, Atropine, Levarterenol, Hypertension, Muscles, Histology, Vasoactive agents, Behavior, Sleep, Brazil.

In cats under chloralose the septal area was electrically stimulated and blood pressure and respiration changes were studied. The most striking finding observed was a fall of blood pressure gradually beginning during stimulation, or after it, and always outlasting the stimulus by 3-5 min. Bradycardia was often a concomitant feature. Changes in respiration consisted in an inhibition either in inspiration or expiration. In a few cases an increase in blood pressure was elicited, but only during the period of stimulation. Several tests indicate that the depressor reaction is due most probably to an inhibition of vasoconstrictor and cardiac accelerating fibers, but a role for vasodilator facilitation cannot be ruled out. The depressor reaction could be due either to nervous or to humoral mechanisms, or to both occurring simultaneously.

The physiological meaning of this reaction is considered in relation to behavioral and sleeping functions of the septal area. (Author)

AD-617 820 Div. 16/1, 16/12

Sao Paulo Univ. (Brazil).
NEUROGENIC HYPERTENSION IN THE RAT,
by Eduardo M. Krieger. 9 Jun 64, 12p
Grant AF AFOSR311 63
Unclassified report

Pub. in Circulation Research v15 p511-21 Dec 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hypertension, Nervous system), (*Nervous system, Hypertension), Rats, Blood pressure, Nerves, Excision, Autonomic nervous system, Adrenal glands, Histology, Pathology, Brazil.

Several techniques of radical denervation of the sino-aortic depressor areas were tried in order to produce a permanent neurogenic hypertension in the rat. A simple one-stage operation for complete sino-aortic baroreceptor denervation is described. This procedure was used in 140 rats that were then studied for periods up to one year. All the operated animals presented some degree of hypertension. Blood pressure measurements made during the first week showed even then that the rats were hypertensive. This observation suggests that in the rat no latent period for the appearance of neurogenic hypertension is present. Hypertension was permanent in 75% of the rats observed up to one year; blood pressure returned to normal values in the remaining 25%, usually after the third month. Extirpation of the adrenal medulla had no effect on the evolution of the hypertension in the denervated rats. The rats seemed to tolerate both the denervation and the hypertension very well. Histological examination of tissues from hypertensive rats showed myocardial hypertrophy and a thickening of the basement membrane of the glomerular capsule. The severity of the latter abnormality was closely associated with the duration of the hypertension. (Author)

AD-617 821 Div. 16/4

Naval Medical Research Unit No. 2, Taipei (Taiwan).
A REPORT ON THE SEASONAL SUCCESSION OF THE BITING MIDGES, CERATOPOGONIDAE, IN THE TAIPEI AREA,
by Wesley K. C. Sun. 1964, 12p
Rept. no. MR005.09-1406.2.6
Proj. MR005.09, Task MR005.09 1406
Unclassified report

Pub. in Tunghai Journal v6 n2 p59-69 Dec 1964
(Copies available only to DDC users).

Descriptors: (*Diptera, Taiwan), Bites + stings, Disease vectors, Climatology, Atmospheric temperature, Humidity, Rainfall, Wind, Collecting methods, Tables.

A collection of ceratopogonids was made in the Taipei area from March 1961 through February 1964 by using New Jersey light traps. The light traps were operated four nights a week and yielded a sample of 4,230 collections for the three year period. The records of ceratopogonid collections and the climatic factors including temperature, relative humidity, rainfall and wind velocity of the Taipei area for 1961-64 were correlated and analyzed by the use of four-week moving means. The yearly pattern of the ceratopogonids collected shows two eminences in spring and autumn alternating with two depressions in cold and hot seasons respectively. (Author)

AD-617 822 Div. 16/2

Naval Medical Research Unit no. 2, Taipei (Taiwan).
BIOCHEMICAL CHARACTERISTICS OF RECENT CHOLERA ISOLATES IN THE FAR EAST.
Research rept.,
by R. W. Swanson and J. D. Gilmore. 1964, 5p
NAVMED MR005.09-1040.2.4
Unclassified report

Pub. in Bulletin of the World Health Organization v31 p422-5 1964 (Copies available only to DDC users).

Descriptors: (*Cholera, Far East), Immunity, Antigen-antibody reactions, Hemolysis, Bacteriophages, Culture media, Test methods, Epidemiology, Biochemistry, Taiwan.

The pronounced change in haemolytic activities observed on examining cholera isolates from different geographical areas in the Far East during 1961-64 makes it apparent that this single biochemical activity is not a reliable criterion for the separation of a biotype or sub-species of vibrio. Furthermore, the measurement of haemolytic activity is a problem of degree and may vary with different laboratories depending upon the availability or selection of media and adherence to the physical requirements of the test procedures employed. Also, it appears doubtful that any reliable epidemiological data can be derived because of the variable results obtained from serial cholera admissions occurring in the same epidemic area. The complete agreement obtained throughout the past three years with the haemagglutination and phage sensitivity tests provides two excellent methods for the rapid differentiation between the classic cholera vibrios and the vibrios isolated recently in the Far East. The rapidity and simplicity of the chicken cell agglutination test make it suitable for field work or for use by laboratories with limited facilities.

AD-617 823 Div. 16/11, 16/4

Naval Medical Research Unit no. 2, Taipei (Taiwan).
CHEMOTHERAPY WITH BITHIONOL-S-OXIDE IN ANIMALS INFECTED WITH PARAGONIMUS WESTERMANI.
Research rept.,
by Dong Chan Kim, Shih Chien Sun, and John F. Bergner, Jr. 1963, 15p
NAVMED MR005.09-2001.2.1
Unclassified report

Pub. in rept. of the National Institute of Health (Rep. of Korea) v1 n1 p153-166 1964 (Copies available only to DDC users).

Descriptors: (*Trematodes, Chemotherapy), (*Parasitic diseases, Chemotherapeutic agents), (*Chemotherapeutic agents, Parasitic diseases), Eggs, Morphology(Biology), Dosage, Medical examination, Histology, Pathology, Dogs, Cats, Monkeys, Taiwan.

Bithionol-S-oxide (Bitin-S) was found to be effective against paragonimiasis in animals infected with Paragonimus westermani. Bitin-S 100mg/kg. body weight was administered every other day or daily for varying periods to cats, dogs and a monkey infected with P. westermani. Efficacy of the agent against paragonimiasis varied depending on host species and on the magnitude of the infection. Paragonimus infection in cats required more prolonged doses than in dogs or monkey; and the heavy-infected animals needed more prolonged treatment than those in light-infected animals. Cats and monkey tolerated the agent 100mg/kg administered every other day for 10 to 12 times and even to the additional 50mg/kg administered

daily for 35 times in cats. Dogs were very sensitive to the agent with the doses 100mg/kg. every other day or 50mg/kg daily administration, showing vomiting, diarrhea, loss of appetite, and loss of body weight. However, no toxic manifestations were found in histo-pathological studies with the above used doses. (Author)

AD-617 824 Div. 16/4

Naval Medical Research Unit no. 2, Taipei (Taiwan).
MOSQUITOES OF TAIWAN: GENUS TOXORHYNCHITES THEOBALD.
Research rept.,
by J. C. Lien. 1965, 17p
NAVMED MR005.09-1406.1.2
Unclassified report

Research done in cooperation with Taiwan Provincial Malaria Research Inst., Chaochow.
Pub. in Journal of Medical Entomology v2 n1 p1-16 Apr 1 1965 (Copies available only to DDC users).

Descriptors: (*Culicidae, Taiwan), (*Morphology(Biology), Culicidae), Adults, Larvae, Males, Females.

The purpose of this paper is to present as fully as possible the descriptions of all stages of the two species of Toxorhynchites in Taiwan, and some aspects of their bionomics. The nomenclature used for larval and pupal setae is that used for Toxorhynchites by Belkin (1962). The drawings were based entirely on the material collected from Taiwan and were prepared by the use of a microprojector, the delicate parts being entered after microprojector, the delicate parts being entered after microscopic examination. The specimens used for descriptions were only those reared individually from immature stages.

AD-617 836 Div. 16/1, 16/12

Walter Reed Army Inst. of Research, Washington, D. C.
URINARY CATECHOLAMINE RESPONSES ASSOCIATED WITH HOSPITAL ADMISSION IN NORMAL HUMAN SUBJECTS,
by Wiley W. Tolson, John W. Mason, Edward J. Sachar, David A. Hamburg, and Joseph H. Handlon.
30 Oct 64, 8p
Unclassified report

Pub. in Journal of Psychosomatic Research v8 p365-72 1965 (Copies available only to DDC users).
Prepared in cooperation with National Institutes of Health, Bethesda, Md.

Descriptors: (*Adrenal medulla hormones, Secretion), (*Adrenal cortex hormones, Secretion), Epinephrine, Levarterenol, Corticosteroid agents, Urine, Amines, Emotions, Hospitals, Medical examination, Psychophysiology.

Urinary epinephrine, norepinephrine and 17--OH--CS (17-hydroxycorticosteroid) levels were higher on the initial day of hospitalization than on subsequent occasions during hospital stay in two groups of normal young adults. A positive correlation was observed between the three hormones in this situation and the possible relationship of these findings to earlier related work in the monkey is discussed. Although group and individual differences in degree of response were noted, limiting the value of hospitalization as an experimental situation in psychosomatic research, the direction of change during hospitalization was quite consistent. It is also suggested that psychoendocrine responses to environmental change must be taken into account in the design of some control experiments in clinical research. (Author)

AD-617 839 Div. 16/1

Suffield Experimental Station, Ralston (Alberta).
NINHYDRIN POSITIVE SUBSTANCES PRESENT IN DIFFERENT AREAS OF NORMAL RAT BRAIN,
Technical paper,
by R. K. Shaw and J. D. Heine. 3 Aug 64, 6p
Suffield technical paper no. 299
Proj. D52 20 20 28
Unclassified report

Pub. in Journal of Neurochemistry v12 p151-5 1965 (Copies available only to DDC users).

Descriptors: (*Brain, Biochemistry), Cerebrum, Cerebellum, Chromatographic analysis, Amino acids, Rats.

The ninhydrin positive substances present in the cerebrum, cerebellum, midbrain and pons medulla of the rat were determined with an amino acid analyser which employs a single cation exchange column. Only ten of the forty-two substances measured were uniformly distributed in the four areas of the brain. The presence of an unknown fraction, eluted from the column after arginine and concentrated in the midbrain, is reported. (Author)

AD-617 844 Div. 16/3, 4/3, 16/1

Walter Reed Army Inst. of Research, Washington, D. C.
THE AMPEROMETRIC TITRATION OF TOTAL AND INTERCHAIN DISULFIDE BONDS IN GAMMA GLOBULIN,
by Gary D. Christian and Peter H. Schur. 3 Sep 64, 5p
Unclassified report

Pub. in Biochimica et Biophysica Acta v97 p358-61 1965(Copies available only to DDC users).

Descriptors: (*Gamma globulin, Chemical bonds), (*Proteins(Simple), Volumetric analysis), Sulfides, Molecular structure, Electrical conductivity.

The total number of disulfide bonds and the corresponding number of interchain disulfide bonds in several gamma globulins are as follows: 7-S-rabbit - 22.5 ± 0.5 and 3; 5-S-rabbit - 17 and 3; 7-S-sheep - 22 and 0; 5-S-sheep - 15 and 0; 7-S-human - 18-19 and 4; 5-S-human - 14 and 4.

AD-617 845 Div. 16/10, 16/12

Walter Reed Army Inst. of Research, Washington, D. C.
THE EFFECT OF ENDOTOXIN ON ABDOMINAL SYMPATHETIC GANGLIA,
by Jean-Rene Dupont and Helmuth Sprinz.
10 Dec 63, 10p
Unclassified report

Pub. in Acta Neurovegetativa v27 n1 p121-30 1965 (Copies available only to DDC users).

Descriptors: (*Toxins + antitoxins, Ganglia), (*Ganglia, Toxins + antitoxins), Abdomen, Autonomic nervous system, Pathology, Diarrhea, Histological techniques, Guinea pigs.

An attempt was made to examine experimentally in 37 guinea pigs two points of longstanding controversy: Can diarrhea or any instestinal lesions be produced by the injection of endotoxin into the regional abdominal sympathetic ganglia, and secondly, does endotoxin evoke a specific pathological response in these ganglia. An attempt was also made to correlate changes in the extramural ganglia, with alteration in the intramural

nervous system. When endotoxin was given intraganglionicly a variety of non-specific toxic lesions were noted in the ganglion cells as well as the gliocytes. Alcohol injection, in an effort to provoke an irritative effect, produced a more destructive lesion. No concomitant changes were observed in the gut. Diarrhea could not be precipitated in any of these animals, nor in their intraperitoneally injected controls, which had no histologic abnormalities in the regional abdominal sympathetic ganglia. It is concluded, therefore, that the role of these ganglia should be minimized as a factor in enteritis, and that clinico-pathological correlation is difficult within the neurovegetative periphery. (Author)

AD-617 846 Div. 16/4

Oxford Univ. (England).
UNITS SENSITIVE TO DIRECTION OF MOVEMENT IN GOLDFISH OPTIC TECTUM,
by J. R. Cronly-Dillon. 1963, 4p
Contract N62558 2453; Grant NIH NB0442201
Unclassified report

Pub. in Nature v203 n4941 p214-5 Jul 11 1964
(Copies available only to DDC users).

Descriptors: (*Vision, Fishes), (*Fishes, Vision), Retina, Light, Stimulation, Visual perception, Illumination, Motion, Sensitivity, Great Britain.

AD-617 847 Div. 16/1, 16/2

California Univ., San Francisco. Medical Center.
ANTISERA TO GAMMA G GLOBULIN AND TO ITS STRUCTURAL SUBUNITS; COMPARISON AS TO RELATIVE EFFICACY AS COOMBS' REAGENTS,
by H. H. Fudenberg and E. C. Franklin. 1964, 5p
Contract Nonr365612; Grant PHS HE05997,
Proj. NR105 308
Unclassified report

Pub. in Vox Sanguinis (Switzerland) v10 p341-5 1965(Copies available only to DDC users).
Prepared in cooperation with New York Univ., N. Y.

Descriptors: (*Gamma globulin, Immune serums), (*Immune serums, Gamma globulin), (*Antigens + antibodies, Gamma globulin), Peptides, Chemical analysis, Proteins(Simple), Blood cells, Immunology.

Antiglobulin reagents prepared to some of the structural subunits of gamma-G globulin were found to be no more sensitive than standard Coomb's sera for the detection of incomplete anti-erythrocyte antibodies.

AD-617 866 Div. 16/11, 16/2

Oxford Univ. (England).
FIXATION OF TETANUS TOXIN BY SUBCELLULAR FRACTIONS OF BRAIN,
by Jane Mellanby, W. E. van Heyningen, and V. P. Whittaker. 23 Jul 64, 3p
Contract N62558 2281, Proj. NR103 474
Unclassified report

Pub. in Journal of Neurochemistry v12 p77-9 1965(Copies available only to DDC users).

Descriptors: (*Brain, Toxins + antitoxins), (*Toxins + antitoxins, Cells(Biology)), (*Clostridium tetani, Toxins + antitoxins), Mitochondria, Microsomes, Nerve cells, Central nervous system, Guinea pigs, Great Britain.

Assays of the capacity of subcellular fractions of guinea pig brain to fix tetanus toxin showed that the toxin was bound more by fractions with a high content of synaptosomes (and nearly as well by a myelin fraction) than by relatively pure mitochondrial or microsomal fractions. (Author)

AD-617 868 Div. 16/3

Queen Mary Coll., Univ. of London (England).
THE USE ISONICOTINYL HYDRAZIDE AS A METABOLIC INHIBITOR IN PHOTOSYNTHESIS,
by C. P. Whittingham, M. Berminghan, R. G. Hiller, and G. G. Pritchard. 1958, 19p
Grant AF EOAR62 24 Proj. 9777 Task 977701
AFOSR 65-0949
Unclassified report

Pub. in Colloques Internationaux du Centre National de la Recherche Scientifique, Gif-Sur-Yvette et Saclay 23-27 Jul y 1962 p571-88.
(Copies available only to DDC users).

Descriptors: (*Photosynthesis, Antimetabolites), (*Antimetabolites, Hydrazine derivatives), (*Hydrazine derivatives, Antimetabolites), Algae, Metabolism, Inhibition, Amino acids, Carbon dioxide, Labelled substances, Great Britain.

The photosynthetic production of glycollic acid in Chlorella was shown to be at a maximum at a low concentration of carbon dioxide and at light intensities approaching those required to saturate photosynthesis. Treatment with isonicotinyl hydrazide resulted in a three-fold stimulation of glycollic acid production. Studies with radioactive carbon dioxide show that glycine and serine were formed together with glycollate. When the radioactive carbon dioxide was replaced by non-radioactive carbon dioxide the compounds of the Calvin cycle lost radioactivity which was accumulated in either glycollate or sucrose suggesting that these were final products of the photosynthetic cycle. At higher concentrations of carbon dioxide sucrose is the main and predominant product but at low concentration of carbon dioxide a significant fraction of the carbon incorporated forms glycollate, glycine and serine. From the experiments with isonicotinyl hydrazide it would appear that as much as 70% of the carbon incorporated can result in glyoxylate and products therefrom. It is considered that these are derived by cleavage of the compound in the CALVIN cycle which is carboxylated to a greater and greater extent the higher the concentration of carbon dioxide. (Author)

AD-617 896 Div. 16/4
CFSTI Prices: HC$1.00 MF$0.50

IIT Research Inst., Chicago, Ill.
DEVELOPMENT OF AN ORALLY EFFECTIVE INSECT REPELLENT.
Progress rept. for 1 Nov 62-31 Jan 63,
by Harbans Lal. 31 Jan 63, 15p Rept. no. ARF-C-222-3
Contract DA49 193MD2281, Proj. C222
Unclassified report

See also AD-617 897.

Descriptors: (*Insect repellants, Effectiveness), (*Culicidae, Insect repellants), Mouth, Biological assay, Mice, Tracer studies, Albumins, Blood, Organic compounds.

The objective of this program is to develop a mosquito repellent which is effective when given internally, preferably orally, in order to afford better protection than the conventional surface repellents presently available. Development of a bioassay technique for testing candidate agents using mice as bait and radioactive albumin as an indicator and the repellent properties of several chemical compounds were previously reported. The present report describes further progress on this program. (Author)

AD-617 897 Div. 16/4
CFSTI Prices: HC$1.00 MF$0.50

IIT Research Inst., Chicago, Ill.
DEVELOPMENT OF AN ORALLY EFFECTIVE INSECT REPELLENT.
Progress rept. for 1 Aug-31 Oct 62,
by Harbens Lal and Ervin J. Hawrylewicz.

31 Oct 62, 18p Rept. no. ARF-C-222-2
Contract DA49 193MD2281, Proj. C222
Unclassified report

Descriptors: (*Insect repellants, Effectiveness), (*Culicidae, Insect repellants), Mouth, Test methods, Biological assay, Mice, Organic compounds, Tracer studies, Toxicity.

Until recently mosquito repellents have been evaluated mainly on humans utilizing subjective criteria. However, human bioassay virtually excludes testing of internally administered compounds as well as testing of many subjects. If new compounds are to be studied as surface or as internally administered repellents, the tests must be conducted on suitable laboratory animals. The objective of the current phase of the program was to develop a screening method for mosquito repellency by using mice. The method developed was tested with commercially available repellents and was found to be a reliable screening technique. (Author)

07. Chemistry

AD-617 228 Div. 4/4, 25/6

Virginia Univ., Charlottesville.
THE PROPERTIES OF SOLIDIFIED GASES AT HIGH PRESSURE,
by J. W. Stewart. 1964, 53p
AROD 3084:7
Unclassified report

Pub. in mono. Physics of High Pressures and the Condensed Phase, Chapter 5, Amsterdam 1964, p189-240 (Copies available only to DDC users).

Descriptors: (*Solidified gases, High pressure research), (*High pressure research, Solidified gases), Thermal properties, Phase studies, Crystal structure, Equations of state, Mechanical properties, Nuclear resonance.

AD-617 231 Div. 4/4, 4/3

Utah State Univ. of Agriculture and Applied Science.
PYROLYSIS STUDIES. XIV. THE PYROLYSIS OF t-BUTYL BENZOATES,
by Grant Gill Smith and Brian L. Yates. 1 Oct 64, 4p
Grant AF AFOSR62 268, Proj. 9762, Task 976202
AFOSR 65-0879
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p702-4 1965 (Copies available only to DDC users).
See also AD-616 470.

Descriptors: (*Pyrolysis, Reaction kinetics), (*Benzoates, Pyrolysis), Thermochemistry, Sterochemistry, Esters, Fluorine compounds, Chlorine compounds, Elimination reactions.

It was thought that a study of the thermal elimination of benzoic acids from t-butyl benzoate esters would be suitable for the determination of oO values. Four consecutive runs were made for 4 different esters, the reactor having a completely deactivated surface before the measuring of each ester. From the results obtained, it is clear that the thermal decomposition of t-butyl benzoates is not a simple intramolecular homogeneous reaction but rather the reaction is subject to occurring also on the walls which activate the reactor and cause an increasing amount of heteorogenous reaction. Since all efforts failed to avoid the heterogeneous reaction, it is apparent that pyrolysis of t-butyl benzoate is not suitable for studying linear free energy relationships. (Author)

AD-617 237 Div. 4/4, 4/2

Canterbury Univ., Christchurch (New Zealand).
PHOTOMETRIC OBSERVATIONS ON THE REACTIONS OF ACTIVE NITROGEN WITH CHLORINE AND BROMINE,
by K. S. Raxworthy and L. F. Phillips. 15 Jul 64, 4p
Grant AF AFOSR264 63
AFOSR 65-0886
Unclassified report

Pub. in Canadian Journal of Chemistry v42 p2928-30 1964(Copies available only to DDC users).

Descriptors: (*Nitrogen, Molecular spectroscopy), (*Chlorides, Nitrogen compounds), (*Bromides, Nitrogen compounds), Chemical reactions, Recombination reactions, Dissociation, Reaction kinetics, Stability, New Zealand.

AD-617 252 Div. 4/4, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Battelle Memorial Inst., Columbus, Ohio.
MEASUREMENT OF TRUE SURFACE AREA IN ELECTRODES.
Quarterly technical progress rept. no. 2, 16 Mar-15 Jun 65,
by John McCallum, Robert F. Redmond, and Charles L. Faust. 2 Jul 65, 22p
Rept. no. BATT-7138-Q2
Contract AF33 615 2225, Proj. 8173, Task 817303 01
Unclassified report

See also AD-613 299.

Descriptors: (*Electrodes, Surface area), (*Surface area, Electrodes), (*Porous metals, Surface area), Electrochemistry, Capacitance, Measurement, Measuring devices(Electrical + electronic), Nickel, Electroforming, Mandrels, Geometry.

The objective of the program is to understand and develop an electrochemical method for determining surface areas in porous electrodes. The measurement of the double-layer capacitance was selected as the most promising method. Further theoretical consideration was given to the matter of geometric effects resulting from the electrolyte resistivity. Such effects can affect the interpretation of double-layer capacitance measurements. Experimental work was concentrated on the improvement of equipment capability and measurement technique. Planned experiments are described which will demonstrate the geometric effects and test the theoretical predictions. These studies will help establish a measurement technique and a supporting theoretical framework for surface-area measurements. (Author)

AD-617 256 Div. 4/3
CFSTI Prices: HC$1.00 MF$0.50

National Bureau of Standards, Washington, D. C.
POLYMERS OF PERFLUOROHEXADIENE, PERFLUOROHEPTADIENE, AND PERFLUOROOCTADIENE,
by James E. Fearn and Leo A. Wall. Feb 65, 22p
Rept. no. NBS-8623
Proj. 31102 11 3110522
Unclassified report

Descriptors: (*Synthesis(Chemistry), Halogenated hydrocarbons), (*Polymerization, Halogenated hydrocarbons), (*Halogenated hydrocarbons, Polymerization), Aliphatic compounds, Fluorine compounds, Diene synthesis.

Perfluoro-1,5-hexadiene, perfluoro-1,6-heltadiene and perfluoro-1,7-octadiene have been prepared and preliminary polymerization studies on the three monomers carried out. Preparation of certain new compounds, perfluoro-1,6-heptadiene and some of its precursors, are reported for the first time. High pressure polymerization was successful in producing new polymers from these perfluorodienes. The polymers, however, were often insoluble and somewhat brittle. It is believed that trace impurities may be interfering with the polymerization process and causing crosslinking, and that greater efforts in purification of monomers must be made in order to obtain useful and thermally stable polymers. (Author)

AD-617 274 Div. 4/3
CFSTI Prices: HC$1.00 MF$0.50

Cincinnati Univ., Ohio.
SYNTHETIC ATTEMPTS FOR THE PREPARATION OF NITROGEN ANALOGS OF AKLANES AND ALKENES.
Final rept.,
by Hans Zimmer. 1965, 8p
Contracts DA33 008ORD1757, DA33 008ORD1971
Unclassified report

Descriptors: (*Azines, Synthesis(Chemistry)), (*Organic nitrogen compounds, Synthesis(Chemistry)), Organic phosphorus compounds, Chemical bonds, Phosphines, Stereochemistry.

The research was concerned with new synthetic methods to obtain compounds containing a >N - N< bond as well as the hitherto virtually unknown class of triazanes; these are compounds having three nitrogen atoms linked together by two single bonds and attached to carbon atoms also by single bonds only; >N - N - N<. Results and conclusions are summarized and a list of publications and reports resulting from the research is given.

AD-617 336 Div. 4/4, 25/7
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
THE DIELECTRIC RELAXATION TIME OF 1,3-BUTANEDIOL AS A FUNCTION OF FREE VOLUME,
by Thomas W. Tarlach and George E. McDuffie.
18 May 65, 47p Rept. no. NOLTR-65-66
Task R360FR105R011 01 01
Unclassified report

Descriptors: (*Alcohols, Dielectric properties), (*Liquids, Molecular association), Molecular properties, Relaxation time, Glycols, Density, Equations.

The report presents dielectric data on 1,3-butanediol in the temperature range of -36C to 51.2C and at pressures from one to three thousand atmospheres. Tables of the static dielectric constant, the infinite frequency dielectric constant, the limiting dielectric relaxation time and the distribution parameter of the Davidson-Cole distribution, are given. In an attempt to explain the temperature-pressure dependence of the dielectric relaxation time, the free volume approach as proposed by Litovitz and Macedo is utilized. In order to fit the dielectric data of this report, it was necessary to slightly modify the free volume equation as presented by these authors through the introduction of a temperature dependent close packed molecular volume.

AD-617 347 Div. 4/3, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Royal Inst. of Tech., Stockholm (Sweden). Dept. of Physics.
DISSOCIATION OF METHYLAMINE MOLECULE IONS FORMED IN CHARGE EXCHANGE COLLISIONS WITH POSITIVE IONS.
Scientific rept.,
by H. Sjogren. 25 Mar 65, 20p Rept. no. SR-1
Contract AF61 052 762
AFCRL 65-423
Unclassified report

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Descriptors: (*Amines, Dissociation), (*Mass spectroscopy, Amines), Ions, Ionization, Probability, Free radicals, Molecular structure, Thermodynamics, Sweden.

Mass spectra of methylamine were obtained after charge exchange with slow positive ions, and the intensities of the peaks were plotted as a function of the energy absorbed by the molecule during the charge exchange. The curves are integrated to give the electron impact mass spectrum, which is compared with experimental values. A region with low probability for ionization seems to exist between 11 and 12 eV. The structure and dissociation of methylamine are discussed. (Author)

AD-617 359 Div. 4/2
CFSTI Prices: HC$1.00 MF$0.50

Mallinckrodt Chemical Lab., Harvard Univ., Cambridge, Mass.
A NEW SYNTHESIS OF GERMYL SILANE BY THE REACTION OF SILYL POTASSIUM WITH GERMYL CHLORIDE,
by Ravi Varma and A. Peter Cox. 1963, 1p
Unclassified report

Descriptors: (*Germanium compounds, Silanes), (*Silanes, Synthesis(Chemistry)), Potassium compounds, Chlorides, Hydrides.

Potassium silyl was prepared by the reaction of disilane, Si2H6, with slight excess of potassium hydride in the presence of monoglyme, 1,2-dimethoxy ethane, over a period of 24 hours at room temperature. After removing volatile products, an excess of germyl chloride was distilled in and allowed to react with SiH3K at room temperature for fifteen minutes. Si2H6 + KH yields SiH3K + SiH4. SiH3K + GeH3Cl yields GeH3SiH3. Germyl silane, GeH3SiH3, produced, was purified by fractionating on a low-temperature column held at approximately -115C to separate GeH3SiH3 from Si2H6 and Ge2H6. (Extracted)

AD-617 365 Div. 4/2, 25/7, 4/4
CFSTI Prices: HC$1.00 MF$0.50

Mallinckrodt Chemical Lab., Harvard Univ., Cambridge, Mass.
SULFUR MONOFLUORIDE: THE MICROWAVE SPECTRUM OF A SECOND ISOMER,
by Robert L. Kuczkowski. 1963, 6p
Unclassified report

Descriptors: (*Sulfur compounds, Microwave spectroscopy), (*Fluorides, Microwave spectroscopy), (*Microwave spectroscopy, Fluorides), (*Molecular isomerism, Fluorides), Mass spectrum, Fluorine, Nuclear spins, Moments, Molecular spectroscopy.

It is demonstrated that a second isomer of S2F2 exists which, on the basis the correlation of the microwave spectrum with mass spectral peaks, fluorine nuclear spin statistical weights, and moments of inertia, is assigned a non-planar chain FSSF structure analogous to S2Cl2.

AD-617 400 Div. 4/4, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Missiles and Space Co., Sunnyvale, Calif.
THEORY OF PLATING BY CATALYTIC CHEMICAL REDUCTION.
Technical rept.,
by D. J. Levy. Jan 62, 27p Rept. no. 6-90-62-3
Unclassified report

Report on Materials and Chemistry.

Descriptors: (*Plating, Catalysis), (*Metal films, Plating), Reduction(Chemistry), Theory, Electrochemistry, Thermodynamics, Complex compounds, Reaction kinetics.

The process of metal plating by catalytic chemical reduction is described on the basis of electrochemical thermodynamics, coordination chemistry, and catalysis. The primary and multiple roles of the metal ion, reductant, ligand, and catalytic substrate are discussed. A single mechanism is proposed for the heterogeneous catalysis reaction which is independent of reactant species or environmental conditions. (Author)

AD-617 431 Div. 4/3

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Chemistry.
NOTES: PREPARATION AND INTRA-INTER-MOLECULAR POLYMERIZATION OF S,S'-DIVINYLMERCAPTALS,
by Helmut Ringsdorf and C. G. Overberger.
2 Mar 62, 2p
Contract DA49 113MD2032
Unclassified report

Pub. in Journal of Polymer Science v61 n171 pS11-2 1962.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Organic sulfur compounds, Synthesis-(Chemistry)), Formaldehyde, Preparation, Polymerization.

The preparation and polymerization of formaldehyde-S,S'-divinylmercaptal are reported where there is a radical for -H. The unsaturated mercaptals can be prepared either by dehydrohalogenation of the beta-chloroethyl-mercaptals or by dehydration of the beta-hydroxyethyl-mercaptals. The latter method is recommended since it affords better yields (30-40%) and does not require the use of chloroethylmercaptals, which are strong vesicants.

AD-617 446 Div. 4/4, 14/8

Princeton Univ., N. J.
SCISSION REACTIONS IN SOME VINYL AND VINYLIDENE POLYMERS.
Revised ed.,
by Arthur V. Tobolsky and Parry M. Norling.
24 Sep 64, 8p
Grant DA ORD31 124 61G62
AROD 1073:40
Unclassified report

Pub. in Journal of Polymer Science: Part A v3 p1435-42 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 16 Jul 64.

Descriptors: (*Polymers, Decomposition), Absorption, Oxygen, Acrylic resins, Chemical reactions.

Rates of autocatalyzed oxygen absorption and chain scission were measured at 160C. and 1 atm. oxygen pressure for copolymers of ethyl acrylate-methyl methacrylate and ethyl acrylate-methyl alpha-chloroacrylate. The crosslinked homopolymers of both the vinylidene-type monomers were very resistant to oxygen uptake and oxidative scission. Increasing amounts of ethyl acrylate in the copolymer systems increased the rate of oxygen absorption and chain scission. Slightly crosslinked poly(methyl methacrylate) containing 5% of dicumyl peroxide showed rapid chain scission at 140C. in the absence of oxygen and negligible chain scission in the presence of oxygen. The same experiment carried out with poly(ethyl acrylate) shows the reverse behavior: crosslinking and little scission in the absence of oxygen and efficient chain scission in the prescence of oxygen. Chemical mechanisms are presented to account for these results. (Author)

AD-617 466 Div. 4/4

Frick Chemical Lab., Princeton Univ., N. J.
DIELECTRIC DISPERSION OF A POLAR-NONPOLAR LIQUID MIXTURE NEAR THE CRITICAL SOLUTION TEMPERATURE,
by R. G. Quinn and C. P. Smyth. 24 Jul 63, 5p
Unclassified report

Pub. in Journal of Chemical Physics v39 n12 p3285-8 Dec 15 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Solutions, Dielectric properties), (*Dielectrics, Molecular association), (*Liquids, Molecular association), Nitrobenzenes, Aliphatic compounds, Mixtures, Relaxation time, Temperature, Density.

The dielectric dispersion of the mixture nitrobenzene and 2,2,4-trimethylpentane was measured at a single concentration over a temperature range from 40C to the temperature of turbidity and at wavelengths of 575 m, 1.26, 3.22, and 10.0 cm. It was found that the dispersion can be characterized by a single relaxation time over most of the temperature range but that a distribution of relaxation times was necessary near the critical solution temperature. The distribution was also found to broaden as the temperature was lowered. The magnitude of the relaxation time was found to tend to a maximum value as the critical solution temperature was approached. The variations of the static dielectric constant and the density were also measured and found to exhibit the usual maxima. The data obtained are discussed in a qualitative manner in terms of cybotactic regions existing within the liquid and similarities between the dielectric and structural relaxation processes are pointed out. (Author)

AD-617 487 Div. 4/3

Cobb Chemical Lab., Univ. of Virginia, Charlottesville.
SOLUTIONS OF ORGANIC COMPOUNDS IN FUSED ALKALI THIOCYANATES,
by Thomas I. Crowell and Paul Hillery. 12 Nov 64, 2p
AROD 4290:1
Unclassified report

Pub. in Journal of Organic Chemistry v30 p1339 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thiocyanates, Alkali metal compounds), (*Alkali metal compounds, Thiocyanates), Hydroxides, Organic compounds, Solubility, Salts, Water, Glycols, Sucrose, Glucose.

High solubility of polyhydroxy compounds was observed in the fused salts of a mixture of the thiocyanates of potassium and sodium and of potassium thiocyanate alone. The hydroxy compounds are apparently unionized in solution, and the fused-salt solubility of the compounds observed shows similarity to their water solubility.

AD-617 490 Div. 4/4

Kansas Univ., Lawrence. Dept. of Chemistry.
CRITICAL OPALESCENCE OF A BINARY LIQUID MIXTURE, n-DECANE-B,B'-DICHLOROTHYL ETHER.

II. SMALL-ANGLE X-RAY SCATTERING,
by B. Chu. 16 Nov 64, 2p
AROD 4089:7

Unclassified report

Pub. in Journal of Chemical Physics v42 n7 p2293-4 Apr 1 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Light, Scattering), (*X-rays, Scattering), (*Liquids, Optical properties), Ethers, Chlorine compounds, Alkanes, Phase studies.

The small-angle x-ray scattering of n-decane and B,B'-dichloroethyl ether has been investigated at the critical-solution concentration over a range of temperatures near the phase-separation temperature in the one-phase region. Composite light- and x-ray scattering curves were constructed. The angular distribution of the scattering was analysed in terms of the Debye theory of critical opalescence. Deviations from the straight-line behavior in plots of reciprocal scattered intensity versus (s/lambda) sq (s = 2 sin 1/2 theta, and lambda is the wavelength in the medium) were observed. (Author)

AD-617 494 Div. 4/4, 4/3, 14/8, 14/9

Frick Chemical Lab., Princeton Univ., N. J.
ON THE MECHANISM OF AUTOXIDATION OF THREE VINYL POLYMERS: POLYPROPYLENE, ETHYLENE-PROPYLENE RUBBER, AND POLY(ETHYL ACRYLATE),
by A. V. Tobolsky, P. M. Norling, N. H. Frick, and H. Yu. 8 Apr 64, 7p
AROD 1073:39

Unclassified report

Pub. in Journal of the American Chemical Society v86 p3925-30 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Vinyl plastics, Oxidation), (*Polyethylene plastics, Oxidation), (*Acrylic resins, Oxidation), (*Oxidation, Vinyl plastics), Polymers, Synthetic rubber, Absorption, Decomposition, Reaction kinetics, Peroxides, Aromatic compounds, Free radicals.

The rates of oxygen absorption and chain scission were measured for the benzoyl peroxide initiated oxidation of atactic polypropylene, an ethylene-propylene rubber (35 mole % propylene), and poly(ethyl acrylate) at 85-110C. Evidence is presented to show that, at all kinetic chain lengths, one initiating radical produces one-chain scission in the absence of side-chain oxidation. This is consistent with the proposal that in certain cases the interaction of two peroxy radicals is the rate-determining step for scission, and that scission does not in certain cases produce propagating radicals. (Author)

AD-617 495 Div. 4/3

California Univ., Los Angeles. Dept. of Chemistry.
REACTIONS OF THERMAL CARBON ATOMS,
by Jeremy L. Sprung, S. Winstein, and W. F. Libby.
24 Feb 65, 3p
Grants AF AFOSR245 65, DA ARO D31 124G271
AROD 3580:19

Unclassified report

Pub. in American Chemical Society. Journal v87 p1812-3 1965(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Carbon, Chemical reactions), (*Aromatic compounds, Chemical reactions), Vapors, Thermochemistry, Monocyclic compounds, Synthesis-(Chemistry).

Zone-refined benzene frozen on a liquid nitrogen cooled surface was bombarded with carbon fragments from carbon vapor. Gas chromatographic analysis of the irradiated benzene shows toluene and cycloheptatriene to be among the reaction products. It seems most probable that these products result from the reaction of benzene with thermal carbon atoms.

AD-617 496 Div. 4/4, 17/2

National Research Council of Canada, Ottawa (Ontario). Div. of Radio and Electrical Engineering.
THE CHEMISORPTION OF NITROGEN ON POLYCRYSTALLINE TUNGSTEN WIRES,
by L. J. Rigby. 14 Dec 64, 16p Rept. no. NRC-8308

Unclassified report

Pub. in Canadian Journal of Physics v43 p532-46 1965 (Copies available only to DDC users).

Descriptors: (*Tungsten, Chemisorption), (*Nitrogen, Chemisorption), (*Chemisorption, Tungsten), Wires, Grain structures(Metallurgy), Phase studies, Heat of activation, Impurities, Mass spectrum, Adsorption, Canada.

Desorption spectra were obtained for successively increasing amounts of nitrogen adsorbed on three polycrystalline tungsten wires at room temperature. Two beta phases were desorbed, beta-1 with first-order kinetics and an activation energy of 73 kcal/mole and beta-2 with second-order kinetics and an activation energy of 75 kcal/mole. Surface impurities such as carbon or thorium reduced the size of the beta-1 phase. Mass spectrometric evidence showed that the small alpha phase was adsorbed as molecules, and the beta-1 and beta-2 phases were adsorbed as atoms. (Author)

AD-617 503 Div. 4/4, 4/3

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
THE DECOMPOSITION OF 2-METHYL-DELTA 2-OXAZOLINE IN AQUEOUS SOLUTION,
by R. Greenhalgh, R. M. Heggie, and M. A. Weinberger. 3 Jan 63, 11p Rept. no. DRCL-406

Unclassified report

Pub. in Canadian Journal of Chemistry v41 p1662-70 1963.
(Copies available only to DDC users).

Descriptors: (*O-heterocyclic compounds, Decomposition), (*N-heterocyclic compounds, Decomposition), Solutions, pH, Nuclear magnetic resonance, Reaction kinetics, Water, Amides, Esters, Alcohols, Canada.

Nuclear magnetic resonance was to follow the decomposition of aqueous solutions of 2-methyl-delta 2-oxazoline (0.29 M) at constant pH values in the range - 1 to 14. The decomposition is first order with respect to total oxazoline at any specific pH, but deviates from the simple reaction of water with the protonated species above pH 5. At neutral pH values this is shown to be partially due to a second reaction involving 2-methyl-delta 2-oxazoline and O-acetylethanolamine which yields N-2-acetoxyethyl N'-2-hydroxyethyl acetamidate. The decrease in rate constant at pH < 2 is accounted for by variation in the water concentration, which is related to the acidity function. A kinetic expression is derived for the decomposition over the whole pH range studied. The decomposition of the amidate is also discussed.

AD-617 504 Div. 4/3, 25/7

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
CYCLOHEXANE COMPOUNDS. IV. NUCLEAR MAGNETIC RESONANCE SPECTRA OF SOME DERIVATIVES OF THE STEREOISOMERIC 3-AMINO-1,2-CYCLOHEXANEDIOLS,
by F. A. L. Anet, R. A. B. Bannard, and L. D. Hall.
29 Apr 63, 9p Rept. no. DRCL-415
Unclassified report

Pub. in Canadian Journal of Chemistry v41 p2331-8 1963 (Copies available only to DDC users).

Descriptors: (*Cyclohexanes, Molecular structure), (*Cyclohexanols, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Cyclohexanols), (*Steriochemistry, Cyclohexanols), Glycols, Amines, Ethers, Molecular isomerism, Canada.

The n.m.r. spectra of 1 alpha-methoxy-2 beta-hydroxy-3 alpha-aminocyclohexane, 1 alpha-methoxy-2 alpha-hydroxy-3 beta-aminocyclohexane, their N-acetyl and O,N-diacetyl derivatives, ethoxy analogues, and 3 alpha-amino-1 alpha, 2 beta-cyclohexanediol and 3 beta-amino-1 alpha, 2 alpha-cyclohexanediol triacetates were measured in chloroform solution. From the chemical shifts of the O- and/or N-acetyl methyl protons it was possible to assign conformations to all the substituted derivatives and in most cases the assignments thus made were confirmed by first-order analysis of the multiplet pattern from the methine protons. In all cases, the conformations found were those predicted on simple conformational grounds and no evidence for a conformational equilibrium at room temperature was obtained from the coupling constants. In general, the coupling constants for the methine protons followed the pattern predicted by the Karplus equation. Acetylation of the 1 alpha-alkoxy-2 alpha-hydroxy-3 beta-aminocyclohexanes with acetic anhydride gave both the O,N-diacetyl derivative and the O,N,N-triacetyl derivative. (Author)

AD-617 523 Div. 4/3, 25/7
CFSTI Prices: HC$2.00 MF$0.50

Texas Univ., Austin. Dept. of Physics.
MOSSBAUER STUDIES OF IRON ORGANOMETALLIC COMPLEXES. IV. SIGN OF THE ELECTRIC FIELD GRADIENT IN FERROCENE,
by R. L. Collins. 1964, 31p
Unclassified report

Descriptors: (*Ferrocenes, Mossbauer effect), (*Mossbauer effect, Ferrocenes), (*Electric fields, Ferrocenes), Metalorganic compounds, Atomic orbitals, Molecular spectroscopy, Nuclear resonance, Atomic energy levels, Perturbation theory, Hamiltonian, Chemical bonds, Nuclear resonance, Powders, Molecular properties.

The quadrupole splitting of Fe57 Mossbauer spectra gives the magnitude, but not the sign, of the electric field gradient. The sign can be determined by magnetically perturbing the energy levels, such that one line splits into a triplet and the other line splits into a doublet. A first-order perturbation treatment for the axially symmetric electric field gradient case is given for powdered samples. The method is applied to ferrocene, which has been the subject of many theoretical papers. A crystal field treatment predicts a positive e.f.g., and molecular orbital treatments predict negative e.f.g.'s. At 40 kilogauss applied, the two lines split clearly into a doublet and a triplet. The result agrees with the m.o. treatment. This also explains the essential vanishing of the e.f.g. in ferrocinium compounds. (Author)

AD-617 580 Div. 4/4, 4/3

Alberta Univ., Edmonton. Dept. of Chemistry.
RADIOLYSIS OF CYCLOHEXANE. V. PURIFIED LIQUID CYCLOHEXANE AND SOLUTIONS OF ADDITIVES,
by S. K. Ho and G. R. Freeman. 29 Feb 64, 9p
Grant DRB1601 17
Unclassified report

Pub. in Journal of Physical Chemistry v68 n8 p2189-97 Aug 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cyclohexanes, Radiation chemistry), (*Radiation chemistry, Cyclohexanes), Gamma rays, Chemical reactions, Hydrogen, Cyclohexanes, Aliphatic compounds, Hydrocarbons, Free radicals, Oxygen, Quinones.

The initial product yields (G values) in the gamma-radiolysis of highly purified liquid cyclohexane have been found to be: hydrogen 5.6 ± 0.1; cyclohexene 3.2 ± 0.2; 1-hexene 0.40 ± 0.05; n-hexane 0.08 ± 0.02; methylcyclopentane 0.15 ± 0.01; ethylcyclohexane approximately 0.04; dicyclohexyl 1.76 ± 0.05; cyclohexylhexene 0.12 ± 0.02; unidentified C(12) approximately 0.05. Cyclohexylcyclohexene was a secondary product. Both oxygen and p-benzoquinone reduced the major liquid product yields to the same limiting values: cyclohexene 1.5 ± 0.1; 1-hexene 0.27 ± 0.03; dicyclohexyl 0.29 ± 0.03. From the reduction in the yields of these products, and on the assumption that free radicals were being scavenged by the additives, a lower limit of 1.1 ± 0.3 was obtained for the ratio of the rate constants k(disproportionation)/k(combination) for cyclohexyl radicals in liquid cyclohexane. (Author)

AD-617 581 Div. 4/4, 25/3

Texas Univ., Austin. Dept. of Physics.
HALL EFFECT IN CONCENTRATED METAL-AMMONIA SOLUTIONS,
by D. S. Kyser and J. C. Thompson. 19 Aug 64, 1p
Unclassified report

Pub. in American Chemical Society. Journal v86 p4509 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hall effect, Solutions), (*Ammonia, Hall effect), (*Lithium, Hall effect), (*Sodium, Hall effect), Electrons, Density, Electrical conductance.

The Hall coefficient was measured in solutions of Li and Na in liquid NH3. The Hall coefficient provides a direct measure of the concentration of unbound (free) electrons. The carrier of electricity in the solution is negatively charged and may safely be presumed to be the electron. At concentrations above 5 mole % (1.8 M), we find almost one free electron per metal atom. In this range, then, the material is metallic in character. As the concentration is decreased below 5 mole %, the free electron concentration drops very rapidly, so that one finds only one free electron per 1000 metal atoms when the concentration of metal atoms is near 2 mole %. The fact that the free electron concentration changes by 1000 while the metal concentration changes by only 2 is difficult to explain. A rapid onset of a metallic state must be taking place. In the absence of spectral data, one cannot assign the identity of the electron traps at the low concentrations. The bound (nonfree) electrons might exist either as solvated electrons or with metal atoms as 'monomers.' (Extracted)

AD-617 584 Div. 4/2, 4/4

Purdue Univ., Lafayette, Ind. Dept. of Chemistry.
ULTRATRACE DETERMINATION OF METALS USING

COORDINATION CHAIN REACTIONS,
by D. W. Margerum and R. K. Steinhaus.
9 Nov 64, 7p
Grant AF AFOSR134 63, Proj. 9710, Task 971001
AFOSR 65-0882

Unclassified report

Pub. in Analytical Chemistry v37 n2 p222-8 Feb 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Metals, Chemical analysis), (*Complex compounds, Chemical analysis), (*Exchange reactions, Metals), Ions, Reaction kinetics, Metalorganic compounds, Ethylenedinitrilo tetraacetates, Nickel compounds, Copper compounds, Colorimetric analysis, Amines, Sulfates.

A chemical kinetic method is proposed for the detection and determination of ultratrace quantities of metal ions. A coordination chain reaction system involving the exchange of triethylenetetramine-nickel(ll) and (ethylenedinitrilo) tetraacetatocuprate(ll) is used. This exchange proceeds by a chain mechanism where the chain centers are the free ligands: EDTA and trien. The rate of the exchange reaction is followed by its color change and is responsive to 10 to the -9 power M concentration changes of EDTA. The theoretical limits for metal determinations suggest that analysis down to the 10 to the -9 power M level with ±5% accuracy should be possible. Experimental results are given down to 10 to the -8 power M. As little as 10 to the 10 power mole of sample can be analyzed with the theoretical limit around 10 to the -11 mole. Any metal ion which complexes EDTA can be determined. (Author)

AD-617 585 Div. 4/4, 4/3

Utah State Univ., Logan. Dept. of Chemistry.
PYROLYSIS STUDIES. XI. POLAR EFFECTS OF ORTHO SUBSTITUENTS,
by D. A. Jones and Grant Gill Smith. 20 Jul 64, 3p
Grant AF AFOSR62 268, Proj. 9762, Task 976202
AFOSR 65-0535

Unclassified report

Pub. in Journal of Organic Chemistry v29 p3531-3 1964 (Copies not available to DDC or Clearinghouse customers).
Presented in part at the National Meeting of the American Chemical Society (144th), Los Angeles, Calif. April, 1963, and the I.U.P.A.C. Conference, London, July, 1963 (paper A1-125).

Descriptors: (*Pyrolysis, Reaction kinetics), (*Benzoates, Pyrolysis), (*Stereochemistry, Pyrolysis), Vapors, Elimination reactions, Dipole moments, Aromatic compounds, Chemical equilibrium.

Polar sigma(O) substituent constants for several substituents have been determined from rate data for vapor phase elimination reactions in which resonance effects are eliminated and proximity effects are minimal. These sigma(O) sub o values agree fairly well with Taft's sigma*-values, and with sigma(O) sub o-values obtained from other literature data. A table of values is given. (Author)

AD-617 588 Div. 4/4, 16/3

Pittsburgh Univ., Pa.
DIFFERENTIAL REACTIVITY OF EXCITED SINGLETS AND TRIPLETS.
Technical rept.,
by J. L. Rosenberg. 27 Jul 64, 5p Rept. no. TR-8
Contract Nonr62408; Grant AF AFOSR349 63,
Proj. NR304 416 Unclassified report

Pub. in Photochemistry and Photobiology v3 p205-8 1964.
(Copies available only to DDC users).

Descriptors: (*Photosynthesis, Atomic energy levels), (*Atomic energy levels, Excitation), (*Fluorescence, Quenching(Inhibition)), Chemical reactions, Electron transitions, Oxygen, pH, Photochemistry, Nuclear spins, Nuclear structure, Polarization, Reaction kinetics, Aromatic compounds.

Experimental data from the oxygen quenching of excited states, from the acidities of excited states, and from the kinetics of photosynthesis indicate that the lowest excited singlet and the lowest triplet states of aromatic molecules may not have the same reactivity. The reasons for these differences may be connected with the energy deficit of triplets, with spin conservation rules, with differences in the nuclear geometry, or with differences in the electronic configuration or polarizability. With improved theoretical representations of excited states, the observed differences in reactivity may serve to increase our understanding of the nature of primary photochemical events. (Author)

AD-617 593 Div. 4/2, 4/4, 4/3

Dartmouth Coll., Hanover, N. H. Dept. of Chemistry.
OXIDATIVE DEGRADATION OF POLYHEDRAL BORANES,
by Alexander Kaczmarczyk, Gerald B. Kolski, and Wesley P. Townsend. 11 Jan 65, 1p
Grant AF AFOSR589 64, Proj. 9710, Task 971002
AFOSR 65-0887

Unclassified report

Pub. in American Chemical Society. Journal v87 p1413 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Boranes, Oxidation), (*Oxidation, Boranes), Decaboranes, Organoboranes, Halides, Degradation, Boric acids, pH, Permanganates.

It is discovered that oxidation of B10H10(-2) and B20H18(-2) by potassium permanganate: (1) proceeds readily to completion at room temperature at pH 7 and (2) results in the quantitative conversion to boric acid. A summary of results is presented for the yield of boric acid from the oxidation of B10H10(-2), B12H12(-2), B20H18(-2), B20H18(-4), and B20H17OH(-4) ions and their organic and halo derivatives by dilute permanganate. One set of data was collected without pH control, and another in weakly acidic to neutral solutions. (Author)

AD-617 596 Div. 4/3

Massachusetts Inst. of Tech., Cambridge.
SYNTHESIS OF MONOHALOCYCLOPROPANES AND 1-HALOOLEFINS VIA PHENYL-(DIHALOMETHYL) MERCURY COMPOUNDS,
by Dietmar Seyferth, Harry D. Simmons, Jr., and Gurdial Singh. 15 Jan 65, 3p
Grants AF AFOSR502 64, DA AROD31 124G495
AROD 2832:20

Unclassified report

Pub. in Journal of Organometallic Chemistry v3 p337-9 1965 (Copies available only to DDC users).

Descriptors: (*Halogenated hydrocarbons, Synthesis-(Chemistry)), (*Metalorganic compounds, Chemical reactions), (*Mercury compounds, Metalorganic compounds), Monocyclic compounds, Alkenes, Chlorine compounds, Bromine compounds, Silanes, Phosphines.

Previous studies of the synthesis of gem-dihalocyclopropanes using C6H5HgCX2Br compounds as CX2 sources were extended to an investigation of the utility of C6H5HgCHXBr compounds in the preparation of monohalocyclopropanes. It was found that both compounds (X=Cl and Br) serve excellently in the preparation of monohalocyclopropanes. A further similarity of C6H5HgCHXBr reagents to C6H5HgCX2Br compounds is seen in their reactions with triethylsilane. A new, general synthesis of vinylic bromides and chlorides based on (dihalomethyl) mercurial chemistry was developed: C6H5HgCHXBr + (C6H5)3P + RR'C=O yields RR'C=CHX + C6H5HgBr + (C6H5)3PO. This general procedure also is applicable to the preparation of olefins of type RR'C=CX2 from aldehydes and ketones. (Extracted)

AD-617 636 Div. 4/4

Queen's Univ., Belfast (Northern Ireland). Dept. of Applied Mathematics.
THREE-BODY IONIC RECOMBINATION,
by D. R. Bates and R. J. Moffett. 1965, 2p
Contract N62558 3634

Unclassified report

Pub. in Nature v205 n4968 p272 Jan 16 1965
(Copies available only to DDC users).

Descriptors: (*Ions, Recombination reactions), (*Recombination reactions, N-body problem), (*N-body problem, Recombination reactions), Chemical equilibrium, Thermodynamics, Mathematical analysis, Great Britain.

Thomson's theory of three-body recombination of positive and negative ions: A(+) + B- + M yields A + B + M, invokes the artifice of a fictitious trapping distance such that recombination may be supposed to occur if either ion collides with a neutral molecule when within this distance from the other. An entirely different approach is outlined, exploiting the fact that a quasi-equilibrium is quickly established in which the rate at which bound ion-pairs are formed and destroyed is very much greater than the rate at which their number density changes. In so far as the contribution from charge transfer is merely additive, this approach is effectively exact in the region where the three-body recombination coefficient is directly proportional to the number density, N(M), of neutral atoms. (Extracted)

AD-617 640 Div. 4/4, 25/2

Florida State Univ., Tallahassee.
THE EFFECT OF CRYSTALLIZATION CONDITIONS AND TEMPERATURE ON THE POLYMORPHIC FORMS OF POLYETHYLENE,
by J. G. Fatou, C. H. Baker, and L. Mandelkern.
Sep 64, 7p
AROD 4222:3

Unclassified report

Pub. in Polymer v6 p243-8 1965 (Copies available only to DDC users).

Descriptors: (*Polyethylene plastics, Crystallography), Crystal structure, X-ray diffraction analysis, Crystallization, Temperature, Heat treatment, Pol.

Experimental evidence (using wide-angle X-ray and dilatometric techniques) is presented to indicate development of a second crystalline form as a result of further crystallization from the melt, and the temperature interval covering its formation and disappearance. Three fractionated samples of polyethylene of viscosity average molecular weights 12 500, 425 000 and 1 000 000 and an unfractionated sample of Marlex 50 of molecular weight 180 000 were used. The extra reflections reported were not observed with rapidly cooled samples. (Author)

AD-617 647 Div. 4/3

Defence Research Chemical Labs., Ottawa (Ontario).
A NEW METHOD FOR THE DETECTION OF SOME AROMATIC ACIDS,
by Douglas W. Grant. 20 Aug 62, 4p
Rept. no. DRCL-384

Unclassified report

Pub. in Journal of Chromatography v10 p511-12 1963
(Copies available only to DDC users).

Descriptors: (*Aromatic compounds, Chromatographic analysis), (*Acids, Chromatographic analysis), (*Chromatographic analysis, Acids), Phthalic acids, Benzoates, Alcohols, Fluorescence, Photochemistry, Hydrogen peroxide, Chemical indicators, Canada.

The classical indicator methods for the detection of aromatic acids on paper chromatograms are relatively insensitive and yield transient colours. The paper describes a new sensitive method based on the formation of fluorescent hydroxy derivatives by means of hydroxyl radicals photochemically generated in dilute aqueous hydrogen peroxide.

AD-617 651 Div. 4/4

Massachusetts Inst. of Tech., Cambridge.
Dept. of Mechanical Engineering.
COMMENTS ON 'WEAK-COUPLING VERSION OF BOGOLIUBOV'S KINETIC THEORY OF GASES',
by C. H. Su. 15 Jul 64, 1p
Contract Nonr184193

Unclassified report

Pub. in Physics of Fluids v7 n12 Dec 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kinetic theory, Gases), Power series, Plasma physics, Statistical mechanics.

AD-617 660 Div. 4/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
OPTIMUM FORM OF INDUSTRIAL VACUUM PUMP EJECTORS,
by S. I. Vilder and B. V. Markachev. 6 Jul 65, 11p
Rept. no. FTD-TT-65-681
TT 65-62575

Unclassified report

Unedited rough draft trans. of Khimicheskoe Mashinostroenie (USSR) v3 n5 p10-3 1961.

Descriptors: (*Vacuum pumps, Jet pumps), (*Jet pumps, Vacuum pumps), Optimization, Design, Ejection, Industrial equipment, USSR.

AD-617 663 Div. 4/2, 4/3
CFSTI Prices: HC$5.00 MF$1.25

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MASTERING OF INACCESSIBLE ELEMENT,
by I. L. Knunyants and A. V. Fokin. 6 Apr 65, 192p

Rept. no. FTD-MT-64-186
TT 65-62578
Unclassified report

Edited machine trans. of mono. Pokorenie Nepristupnogo Elementa, Moscow, 1963, p1-192. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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Descriptors: (*Fluorine, Chemistry), Fluorine compounds, Organic compounds, Inorganic compounds, Chemical properties, Fluorides, Synthesis(Chemistry), Halocarbon plastics, Elastomers, Polymerization, Halogenated hydrocarbons, Dyes, Medicine, Toxicity, USSR.

Fluorine is the most active and the most aggressive chemical element in nature. Until recently destructive properties made impossible use of it for needs of humanity. But now chemists have won victory. Fluorine is mastered and is placed in service of nuclear and jet engineering, aviation and astronautics, science and industry. This book is story of history of mastering of fluorine, full of failures, tragic events and victories, the story of its compounds with inorganic and organic substances and of their truly unusual properties. (Author)

AD-617 704 Div. 4/2, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Harvard Univ., Cambridge, Mass. Dept. of Chemistry.
THE MICROWAVE SPECTRUM OF XENON OXYTETRAFLUORIDE,
by Joseph Martins and E. Bright Wilson, Jr. 1964, 4p
Unclassified report

Supported by Office of Naval Research.

Descriptors: (*Xenon, Microwave spectroscopy), (*Oxyfluorides, Microwave spectroscopy), (*Microwave spectroscopy, Xenon), Molecular structure, Chemical bonds, Labeled substances, Electron transitions.

The microwave spectrum of XeOF4 was investigated in the region of 20-40 kMc with a conventional Stark modulated spectrometer. Transitions were observed for five naturally-occurring isotopes of xenon in the 016 species and for two of these isotopes in an 018 enriched sample. The simplicity of the spectrum and its first order Stark effect are characteristic of symmetric tops. From the rotational constants of the various isotopic species the structural parameters, based on a C4v model, were calculated. The xenon-oxygen bond appears to be a little shorter in XeOF4 than in crystalline XeO3 for which X-Ray methods give 1.76 A. This is consistent with the force constants measured for the two compounds: 7.10 md/A for XeOF4 and 5.66 md/A in XeO3. (Extracted)

AD-617 797 Div. 4/4, 25/7, 25/6, 25/4
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Santa Barbara.
QUANTITATIVE STUDIES BY OPTICAL SPECTROSCOPY OF ENERGY EXCHANGE MECHANISMS IN SIMPLE GASES AND SOLIDS.
Semi-annual technical rept. for 1 Jan-1 Jul 65,
by H. P. Broida, S. L. Shapiro, J. S. Margolis, H. D. Pruett, and K. Schofield. 1 Jul 65, 26p .
Rept. no. TR-11
Contract Nonr422201, ARPA order 125
Unclassified report

See also AD-610 094.

Descriptors: (*Phase studies, Helium group gases), (*Silicon compounds, Nitrides), (*Nitrides, Emissivity), (*Nitrogen, Emissivity), (*Plasma medium, Analysis), Spectroscopy, Solidified gases, Argon, Krypton, Lasers, Scattering, Carbon compounds, Sulfides, Aromatic compounds, Raman spectroscopy, Electrical discharges, Atomic energy levels, Helium, Glow discharges, Probes(Electromagnetic).

Work has continued in three general directions: condensed phase experiments, emission studies of SiN and N2(+), and plasma analysis. Improvements in apparatus allowed measurement of free carrier mobilities in solid and liquid argon and krypton. As a preliminary to the study of scattering processes, using laser beams, in liquids and van der Waal's solids, equipment and techniques were developed, which allowed observation of Raman and Brillouin scattering in CS2 and benzene liquids. Charge transfer processes in the benzene-iodine complex are being studied at low temperatures using absorption methods. The study has continued of flowing gas systems where the initiating energy source is an electrical discharge. The addition of volatile silicon compounds to active nitrogen has yielded new information on the electronic states of SiN. In a study of N2(+), a detailed perturbation calculation on the mutual interaction between the v = 1 level of the B(2)Σ state and the v = 11 level of the A(2)pi state were completed. Populations of vibrational and electronic states of N2(+) excited in a helium afterglow were obtained over a large pressure range. (Author)

AD-617 813 Div. 4/4, 4/3

Alberta Univ., Edmonton. Dept. of Chemistry.
EFFECTS OF pH IN THE GAMMA-RADIOLYSIS OF AQUEOUS SOLUTIONS OF CYSTEINE AND METHYL MERCAPTAN,
by D. A. Armstrong and V. G. Wilkening. 26 Jun 64, 5p
Unclassified report

Research supported by Defense Research Board, Ottawa (Ontario).
Pub. in Canadian Journal of Chemistry v42 p2631-5 1964 (Copies available only to DDC users).

Descriptors: (*Amino acids, Radiochemistry), (*Thiols, Radiochemistry), (*Radiochemistry, Organic sulfur compounds), Decomposition, Reaction kinetics, Gamma rays, pH, Hydrogen peroxide, Canada.

AD-617 814 Div. 4/3

Alberta Univ., Edmonton. Dept. of Chemistry.
SOME BASE-CATALYZED CONDENSATIONS OF SYSTEMS OF THE FORM R1R2C=C(CN)2.
Revised ed.,
by Mary R. S. Weir and J. B. Hyne. 2 Nov 64, 12p
Grant DRB2001 01
Unclassified report

Pub. in Canadian Journal of Chemistry v43 p772-81 1965 (Copies available only to DDC users).

Descriptors: (*Nitriles, Condensation reactions), (*Condensation reactions, Nitriles), Monocyclic compounds, Polycyclic compounds, Bases(Chemistry), Molecular structure, Nuclear magnetic resonance, Canada.

Investigations were made of the condensations of the systems PhCH3C=C(CN)2, PhHC=C(CN)2, and CH3HC=C(CN)2 in the presence of organic bases. Proton nuclear magnetic resonance (n.m.r.) spectral evidence is presented in support of the suggested structures of the condensation products, and an attempt has been made to

present diagrammatically the interrelation between these condensations and other known reaction pathways for condensations of this type. (Author)

AD-617 817 Div. 4/4, 25/2

National Electrotechnical Inst., Turin (Italy).
Cu REPRECIPITATION AND ELECTROLUMINESCENCE IN ZnS SINGLE CRYSTALS,
by G. Bonfiglioli and A. Suardo. Oct 64, 5p
Grant AF EOAR63 87, Proj. 9763, Task 976302
AFOSR 65-0751

Unclassified report

Pub. in Physics Letters v13 n3 p197-8 Dec 1 1964 (Copies available only to DDC users).

Descriptors: (*Electroluminescence, Copper), (*Chemical precipitation, Copper), (*Single crystals, Electroluminescence), Heat treatment, Zinc compounds, Sulfides, Crystal lattice defects, Aging(Materials).

The occurrence of a large aging effect in Cu-doped electroluminescent ZnS single crystals is demonstrated. It is suggested that the ac electroluminescent behavior of this material is influenced by reprecipitation of the Cu-rich phase within the host matrix. (Author)

AD-617 827 Div. 4/3

Duke Univ., Durham, N. C. Dept. of Chemistry.
TWOFOLD TERMINAL ALKYLATIONS OF DISODIO BETA-DIKETONES WITH METHYLENE HALIDES TO FORM BIS-BETA-DIKETONES,
by K. Gerald Hampton, Robley J. Light, and Charles R. Hauser. 2 Dec 64, 5p
AROD 3581:8

Unclassified report

Pub. in Journal of Organic Chemistry v30 p1413-6 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ketones, Chemical reactions), (*Sodium compounds, Ketones), Halogenated hydrocarbons, H-heterocyclic compounds, Synthesis(Chemistry).

Disodiobenzoylacetone and certain related disodio beta-diketones, prepared from the beta-diketones by means of sodamide in liquid ammonia, underwent twofold alkylations at the terminal position with 1,3-dibromopropane and higher methylene halides to form bis-beta-diketones. Some of the bis-beta-diketones underwent twofold cyclizations with hydrazine to give dipyrazoles. Although the present method of synthesis of the bis-beta-diketones failed with ethylene and methylene halides, it appears generally superior to twofold acylations of sodio ketones with diacid chlorides or diesters. Certain twofold alkylations of dipotassio beta-diketones have afforded bis-beta-diketones in lower yields than corresponding cases with disodio beta-diketones. Disodioacetylacetone converted diphenyldichloromethane to tetraphenylethylene. (Author)

AD-617 829 Div. 4/4, 26/7

Northwestern Univ., Evanston, Ill. Dept. of Chemistry.
SYMMETRY NUMBERS AND REACTION RATES. II. THE COMPUTATION OF THE REACTION-PATH DEGENERACY FOR BIMOLECULAR REACTIONS,
by E. W. Schlag and Gary L. Haller. 28 Jul 64, 5p
Grant AF AFOSR62 83
AFOSR 65-0878

Unclassified report

Pub. in Journal of Chemical Physics v42 n2 p584-7 Jan 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Reaction kinetics, Theory), Molecular association, Chemical reactions, Transport properties, Chemical equilibrium, Molecular rotation.

The reaction path degeneracy n is a needed parameter in the computation of a rate constant based on absolute rate theory since it is only partially provided by the symmetry numbers. The previous group theoretical method for deriving n is examined for the case of bimolecular reactions. Furthermore, this method is compared to a direct count of the number of reaction possibilities, and it is seen, by comparison, that there are some difficulties in the application of the direct count method. Some direct count rules are derived which should avoid these difficulties. The computation of equilibrium constants and rate constants for reactions involving optically active species is discussed. (Author)

AD-617 830 Div. 4/4, 16/3

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
THE CO60 GAMMA-RADIOLYSIS OF AQUEOUS CYSTINE SOLUTIONS. I. THE EFFECT OF CHLORIDE ION ON THE AMMONIA YIELD,
by W. A. Armstrong and D. W. Grant. 1963, 8p
Rept. no. DRCL-407

Unclassified report

Pub. in Canadian Journal of Chemistry v41 p1882-7 1963 (Copies available only to DDC users).

Descriptors: (*Amino acids, Radiochemistry), (*Radiochemistry, Amino acids), (*Ammonia, Synthesis(Chemistry)), Chlorides, Ions, Decomposition, Gamma rays, Reaction kinetics, Sodium compounds, Canada.

Sodium chloride was found to increase the ammonia yield from CO60 gamma-irradiated cystine in 0.02 M H2SO4. The effect is attributed to the participation of chlorine atoms, which deaminate the amino acid to a greater extent than hydroxyl radicals. The ratio of the rate constants kOH + cystine/kOH + C1(-) is determined to be 24 in 0.02 M H2SO4. (Author)

AD-617 831 Div. 4/4, 4/2

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
ON THE FORMATION OF 'Ag2O3' ON SILVER ELECTRODES,
by E. J. Casey and W. J. Moroz. 20 Nov 64, 17p
Rept. no. DCBRL-454

Unclassified report

Pub. in Canadian Journal of Chemistry v43 p1199-1214 1965 (Copies available only to DDC users).

Descriptors: (*Electrodes, Oxidation), (*Silver compounds, Oxides), Electrochemistry, Decomposition, Reaction kinetics, Pyrolysis, Heat of activation, Films, Canada.

'Ag2O3' was examined electrochemically in eutectic KOH-H2O at -40C by coulombic measurements of quantities formed, open circuit potential decays, variation of potential as a function of anodic current density, and temperature coefficients of decomposition rates. It can be formed directly from Ag2O on Ag at current density (c.d.) > 15 micro A/sq cm, with a maximum thickness during the first oxidation cycle

occurring at 65 micro A/sq cm. Potential decay curves have protracted linear regions where 0.045 < b < 0.078, sometimes higher. One-tenth of a layer or adsorbed species superimposed on the higher oxide exists on the surface during O2 evolution. Reduction curves show a minimum in the potential decay of the higher oxide preceding the formation of Ag2O. The 'Ag2O3' decomposes in approximately 1 h at -40C to either AgO or Ag2O. The activation energy for its thermal decomposition is 12.0 ± 2.0 kcal/mole. Under most experimental conditions studied the results indicated that the material is not true Ag2O3 but it is probably better described as Ag2O(O) where (O) is trapped oxygen. The evidence does point to the probable existence of a thin layer, which may be true Ag2O3, on the surface in a steady state which is maintained at high anodic current density (> 100 micro A/sq cm at -40C). (Author)

AD-617 837 Div. 4/2, 25/2

Naval Ordnance Test Station, China Lake, Calif.
DETERMINATION OF COBALT IN COBALT-DOPED SODIUM CHLORIDE CRYSTALS,
by Marian E. Hills and Gerald C. Whitnack.
6 Nov 64, 12p NOTS-TP-3835
Task R360FR106 2161R0111 01 001
NAVWEPS 8758

Unclassified report

Pub. in Talanta v12 p237-42 1965(Copies available only to DDC users).

Descriptors: (*Sodium compounds, Chlorides), (*Cobalt, Chemical analysis), Single crystals, Impurities, Absorption spectrum, Polarographic analysis.

Cobalt in low concentrations in single crystals, grown from sodium chloride melts containing cobalt chloride, is rapidly determined, without destroying the crystals, by measuring the absorbance of the 215 -millimicron band. The lower limit for measurement of cobalt by this method is about 10 to the 16th cobalt ions/cc for a crystal piece 1 cm thick. The molar extinction coefficient of the 215 -millimicron absorption band in the crystals is about 7000. Single-sweep polarography is used to calibrate the absorbance by determining the concentration of cobalt in solutions prepared from the cobalt-doped sodium chloric crystals. Cobalt can be determined in sodium chloride solution (0.05 g of NaC1/m1) in concentrations as low as 5 x 10 to the -9 g/ml by single-sweep polarography. This corresponds to 2 x 10 to the 15th cobalt ions/cc of crystal. (Author)

AD-617 840 Div. 4/4, 25/2

Eaton Electronics Research Lab., McGill Univ., Montreal (Quebec).
MEASUREMENT OF SPIN-LATTICE RELAXATION AT 890 Mc/s BY A RESONANCE-DISPERSION TECHNIQUE,
by J. A. Carruthers and N. C. Rumin. 30 Nov 64, 19p
Grant DRB9512 20

Unclassified report

Pub. in Canadian Journal of Physics v43 p576-93 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Spin, Electrons), (*Crystal lattices, Spin), (*Relaxation time, Electron transitions), Paramagnetic resonance, Chromium, Ultrahigh frequency.

A new technique has been used to measure the spin-lattice relaxation time of Cr(+++) in K3Co(CN)6 at 890 Mc/s. The method depends on observing both the amplitude and phase of the audio signal developed at the modulation frequency in a bridge-type microwave resonance spectrometer. One or more modulation frequencies are used, depending on the value of the relaxation time and the degree of saturation employed. Although similar to the saturation technique, this method does not require knowledge of the power level or the linewidth, and is suited to measurements on weak lines. Results have been obtained for lines at 100, 300, 1400, and 2100 oersteds, using crystals containing 0.06% and 0.4% chromium. The values of T for the lower concentration are in the 20-30-millisecond range, but relaxation appears to be not equivalent to a single time-constant. For the higher concentration the relaxation times are shorter and there is a marked evidence of multiple time-constants. (Author)

AD-617 870 Div. 4/3, 14/8

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Chemistry.
PRESENTATION AND POLYMERIZATION OF DITHIOCARBOLIC ACID-S, S'-DIVINYLESTER(Darstellung und Polymerisation von Dithiokohlensaure-S,S'-Divinylester),
by Von Helmut Ringsdorf and C. G. Overberger.
17 Nov 60, 6p

Unclassified report

Pub. in Makromolekulare Chemie (Switzerland) v44/46 p418-26 1961(Copies available only to DDC users).
Text in German.

Descriptors: (*Organic sulfur compounds, Polymerization), (*Polyester plastics, Synthesis(Chemistry)), Carbonates, Thiols, Chemical reactions.

S,S'-Divinyldithiocarbonate was prepared by the dehydrohalogenation of the reaction product of 1 mole of phosgene and 2 moles of ethylene sulfide. The divinyl compound was susceptible to radical polymerization. Solution polymerization in benzene yielded a soluble polymer, via an intromolecular-intermolecular reaction mechanism, with the alpha-methylene-trimethylenedithiocarbonate group as main chain unit. (Author)

AD-617 871 Div. 4/3, 14/8

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Chemistry.
UNSATURATED CARBONIC ACID DERIVATIVES III. COPOLYMERIZATION BEHAVOIR OF S-, O- AND N-VINYL DERIVATIVES OF CARBONIC ACID,
by H. Ringsdorf, N. Weinshenker, and C. G. Overberger. 10 Jan 63, 6p
Contract DA49 193MD2032

Unclassified report

Pub. in Die Makromolekulare Chemie v64 p126-34 1963 (Copies available only to DDC users).

Descriptors: (*Organic sulfur compounds, Copolymerization), (*Organic oxygen compounds, Copolymerization), (*Organic nitrogen compounds, Copolymerization), (*Polyester plastics, Synthesis(Chemistry)), Carbonates, Thiols, Amides, Styrene plastics, Acetates, Vinyl plastics.

S-Vinyl-N-diethyl monothiolcarbamate, O-Vinyl-N-diethyl carbamate, and N-Vinyl-N-methyl-S-ethyl monothiolcarbamate were copolymerized with styrene and vinyl acetate. The ALFREY-PRICE Q- and e-values were calculated and compared with those of other S-, O-, and N-vinyl monomers. The S-vinyl thiolcarbamate

was found to be more reactive as a comonomer than the N- or O-vinyl compounds. (Author)

AD-617 895 Div. 4/2, 25/7
CFSTI Prices: HC$1.00 MF$0.50

RIAS, Inc., Baltimore, Md.
THEORETICAL AND QUANTUM CHEMISTRY OF BORON COMPOUNDS.
Final rept. for 1 Feb 63-31 Jan 65,
by Joyce J. Kaufman. 31 Jan 65, 5p
Contract AF49 638 1220, Proj. 9750, Task 975002
AFOSR 65-1057

Unclassified report

Descriptors: (*Boron compounds, Chemistry), Reports, Theory, Mathematical analysis, Atomic energy levels, Atomic orbitals, Molecular structure, Molecular properties, Nitrogen compounds, Oxidizers, Chemical bonds, Ionization potentials, Free radicals, Quantum mechanics.

08. Earth Sciences and Oceanography

AD-617 224 Div. 2/9, 20/1

Scripps Institution of Oceanography, Univ. of California, La Jolla.
ISOTOPIC COMPOSITION OF LEAD IN THE SEDIMENTS NEAR JAPAN TRENCH,
by Tsaihwa J. Chow and M. Tatsumoto. 6 Jan 64, 7p
Contract Nonr221623, Proj. NR083 005
Unclassified report

Pub. in mono. Recent Researches in the Fields of Hydrosphere, Atmosphere and Nuclear Geochemistry (Festival Volume) Tokyo, 1964 p179-83
(Copies available only to DDC users).

Descriptors: (*Lead, Geochemistry), (*Geochemistry, Lead), (*Marine geology, Geochemistry), Pacific Ocean, Japan, Ocean bottom sampling, Sedimentation, Isotopes, Nuclear physics, Economic geology.

The isotopic composition of lead in the sediments near the Japan Trench was determined. The values are: (206) PB/204PB=18.45; (207)PB/(204) PB=15.63; and (208)PB/(204)PB=38.68. The mu and kappa values of the source material are also calculated to be 8.8 and 3.9 respectively. (Author)

AD-617 254 Div. 2/2, 24/2, 8/2
CFSTI Prices: HC$3.00 MF$0.75

Air Force Cambridge Research Labs., Bedford, Mass.
ON THE RESOLVING POWER OF GROUND MAPPING RADAR ANTENNAS.
Physical sciences research papers,
by J. F. McIlvenna and C. J. Drane, Jr. May 65, 60p Rept. nos. AFCRL-65-322; PSRP-104
Proj. 4600, Task 460006
Unclassified report

Descriptors: (*Radar, Mapping), (*Mapping, Radar equipment), (*Aerial photography, Radar equipment), Airborne, Radar antennas, Resolution, Ground photographs, Radar targets, Integral transforms, Bessel functions, Communication theory, Radar scanning.

The mapping of extended, cultural ground targets by an airborne radar is examined using communication theory concepts including those of the antenna transfer function and the target spatial frequency spectrum. Use of the set of transfer functions that correspond to Taylor aperture distributions and specification of the targets directly in terms of their spatial frequency spectra, permits one to examine the antenna images for quality and resolution. The results obtained indicate that resolution for a class of ground targets can be much better than is predicted by the two-point Rayleigh resolution criterion. It is also true that there can be situations in which the shape of the antenna images are quite independent of the radiation pattern. Several types of spatial noise were also included in the input spectrum to investigate noise effects on image quality and resolution. (Author)

AD-617 268 Div. 2/9, 31/4
CFSTI Prices: HC$1.00 MF$0.50

Navy Electronics Lab., San Diego, Calif.
EVALUATION OF THE CONTROL CHARACTERISTICS OF BATHYSCAPH BALLAST.
Evaluation rept. for Jun-Aug 59,
by R. K. Logan. 11 Feb 60, 22p
Rept. no. NEL-956 Unclassified report

Descriptors: (*Oceanographic vessels, Ballast), (*Ballast, Oceanographic vessels), Submarine hulls, Oceanology, Ocean bottom, Steel, Spheres, Hydrocarbons, Buoyancy.

A study was made of the steel shot used as ballast in the bathyscaph TRIESTE, to compare the type procured in Italy with that available in the United States. Tests indicated that the 0.079-inch-diameter steel shot obtainable in the United States will function as effectively as the Italian shot, under similar conditions.

AD-617 296 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ., Columbus.
CHANGES IN THE GEODETIC COORDINATES DUE TO A CHANGE IN THE REFERENCE ELLIPSOID.
Master's thesis,
by John Charles Herring. 1965, 93p
Unclassified report

Descriptors: (*Geodesics, Measurement), (*Ellipsoids, Geodesics), Surveying, Geophysics, Differential equations, Programming(Computers).

Four methods are discussed for converting known geodetic coordinates given on various world datums to a single unified world datum. They are the Vening Meinesz Equations, the Space Rectangular Coordinates method, the Baldini Equations, and the Isoparametric Method.

AD-617 297 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Ohio State Univ., Columbus.
AN INVESTIGATION OF VARIOUS METHODS OF SECOND ORDER LONGITUDE DETERMINATIONS.
Master's thesis,
by Edward Robert Therkelsen. 1965, 93p
Unclassified report

Descriptors: (*Geodesics, Surveying), Astronomical geodesics, Azimuth, Time, Chronographs.

The different methods of second order longitude determinations as compiled by Conner are investigated and evaluated.

AD-617 331 Div. 2/9, 24/2
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
MICROTOPOGRAPHY OF SEA FLOOR EAST OF GOLDING CAY, BAHAMAS,
by Daniel Friedman. May 65, 13p
NRL Memo. rept. 1612
Unclassified report

Descriptors: (*Microphotography, Ocean bottom topography), (*Marine geology, Microphotography), (*Photogeology, Ocean bottom topography), Caribbean Sea, Bahama Islands, Photographic analysis.

The steepest part of the banks of the Tongue of the Ocean (TOTO) extends from a depth of about 40 - 60m to a depth of 150 - 300m. From there the slope decreases, blending into the relatively flat bottom of the main part of the Tongue. To study these phenomena in more detail, a series of bottom photographs were made of an area off Golding Cay. An overlapping set of photographs was taken at depths ranging from 390 meters to a little over 1000 meters.

AD-617 356 Div. 2/6
CFSTI Prices: HC$7.00 MF$1.75

Geophysical and Polar Research Center, Univ. of Wisconsin, Madison.
THE RELATION OF GRAVITY ANOMALIES TO SURFACE ELEVATION, CRUSTAL STRUCTURE AND GEOLOGY.
Research rept. (Final),
by George P. Woollard. Dec 62, 337p
Rept. no. RR-62-9
Contract AF23 601 3455
Unclassified report

Descriptors: (*Gravity, Structural geology), (*Structural geology, Gravity), (*Geodesics, Gravity), Geophysics, Terrain, North America, Australia, Europe, India., Union of South Africa, Atlantic Ocean, Pacific Ocean, Correlation techniques.

This report represents a study to determine the degree to which gravity values are related to surface elevation, geology and crustal structure. This study was prompted by the need for gravitational information on a world-wide basis for geodetic studies and the fact that gravitational information is lacking or not available for about three-fourths of the earth's surface. If a set of reliable general relations could be established between surface elevation, crustal and geologic parameters and gravity values, it would be possible to overcome in large measure this serious handicap. The study presented is based upon relations observed in North America, Australia, Europe, India, South Africa, and the Atlantic and Pacific Ocean Basins. (Author)

AD-617 396 Div. 9/2
CFSTI Prices: HC$1.00 MF$0.50

MICTRON, Inc., Albany, N. Y.
C.W. X-BAND VOLTAGE TUNABLE OSCILLATOR.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by M. R. Boyd and M. Weinstein. 31 Mar 65, 19p
Contract DA36 039AMC03270E, Task 1P6 22001A055 04
Unclassified report

See also AD-601 594.

Descriptors: (*Microwave oscillators, X-band), (*Magnetrons, X-band), Reliability(Electronics), Radiofrequency power, Performance(Engineering), Packaging, Voltage, Tuned circuits, Electron tubes.

The experimental effort on tube development was concentrated on attempts to determine the factors which contribute to the wide variation in R.F. performance. This effort was mainly concerned with the Design II approach. The packaging aspect of the program also received attention during this period. (Author)

AD-617 442 Div. 2/5

Texas Univ., Austin.
LATE PALEOZOIC MOVEMENT ALONG THE TEXAS LINEAMENT,
by William R. Muehlberger. 1964, 9p
Contract AF49 638 1115
Unclassified report

Pub. in New York Academy of Sciences. Transactions ser2 v27 n4 p385-92 Feb 1965 (Copies not available to DDC or Clearinghouse customers)
Presented at a meeting of the Section on January 4, 1965.

Descriptors: (*Structural geology, Texas), Geological survey, Faults(Geology), Petrology, Stratigraphy, Geology.

The Texas Lineament is a zone of structural discontinuity extending in a west-northwest direction from south of Corpus Christi to El Paso and westward across southern Arizona to the Transverse Ranges of southern California. About 200-250 miles of right-lateral slip took place along this lineament during the late Paleozoic. This interpretation is supported by two lines of reasoning. (1) Paleozoic Ouachita facies rocks in the Marathon region of west Texas arc eastward as they approach the lineament from the south; Ouachita facies rocks are not present along the southern margin of the Val Verde basin (which lies astride the Texas lineament) but occur about 200 miles southeast near Uvalde on the north side of the lineament from whence they can be traced in the subsurface to the outcrops in the Ouachita Mountains of Oklahoma. (2) Isotopic age determinations on Precambrian basement rocks of this region show that the rocks are progressively older to the west and that rocks south of the zone are invariably younger than those north of it. The 'Grenville front' from north-central Texas to the southern Central Basin Platform, as projected into the Texas lineament from the north, is offset about 250 miles to a point west of El Paso.

AD-617 474 Div. 2/8, 25/2, 4/4, 25/7

McMaster Univ., Hamilton (Ontario). Dept of Metallurgy and Metallurgical Engineering.
NMR STUDIES OF HYDRATED SODIUM TETRABORATE MINERALS. I. BORON-OXYGEN POLYION IN BORAX AND TINCALCONITE,
by J. D. Cuthbert and H. E. Petch. 27 Dec 62, 9p
Unclassified report

Pub. in Journal of Chemical Physics v38 n8 p1912-9 Apr 15 1963 (Copies not available to DDC or Clearinghouse customers).
Research supported by Defence Board, Ottawa (Canada).

Descriptors: (*Sodium compounds, Borates), (*Borates, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Borates), Hydrates, Ions, Boron, Oxygen, Single crystals, Quadrupole moments, Symmetry-(Crystallography), Molecular structure, Minerals, Canada.

The quadrupolar splittings of the B11 nuclear magnetic resonance (NMR) signals in single crystals of borax, $Na_2B_4O_7.10H_2O$, and tincalconite, $Na_2B_4O_7.5H_2O$, were investigated. The electric quadrupole coupling constants and asymmetry parameters of the electric field gradient tensors at the two unique B11 sites in the two crystals were determined. The orientations of the principal axes of the electric field gradient were also determined. The picture of the boron-oxygen polyion in borax as given by NMR is in complete agreement with the x-ray results as to numbers and coordinations of boron atoms, symmetry of the polyion and orientation of the planes of the triangularly coordinated boron atoms. The NMR results also indicate that the same boron-oxygen polyion occurs in tincalconite as in borax. (Author)

AD-617 507 Div. 2/6, 2/9

Pacific Naval Lab., Esquimalt (British Columbia).
MAGNETIC VARIATIONS PRODUCED BY OCEAN SWELL,
by K. C. Maclure, R. A. Hafer, and J. T. Weaver.
1964, 5p Reprint-64-13
Unclassified report

Pub. in Nature v204 n4965 p1290-1 Dec 26 1964
(Copies available only to DDC users).

Descriptors: (*Terrestrial magnetism, Marine geophysics), (*Ocean waves, Magnetic properties), (*Marine geophysics, Terrestrial magnetism), Magnetic fields, Oscillation, Measurement, Magnetometers.

Confirmation that the ocean swell does produce appreciable magnetic signals was obtained by recent experimental work in deep water off the west coast of Vancouver Island. Measurements were made under both calm and moderate sea conditions, but a long-period swell, measured by a vertical accelerometer fitted to the raft, was always present. On three different days the principal period of the swell (running approximately perpendicular to the magnetic meridian) was 16.7 sec, 11.8 sec and 11.1 sec, respectively, and in each case the magnetometer, suspended at a depth of 100 m, recorded a magnetic signal of approximately the same period. The power spectra and cross-correlation for the accelerometer and magnetometer signals were computed from about an hour's data for each of the three days. The coherence between the two signals was found to be very high indeed, and values of the magnetic signal per metre amplitude of the swell, which were computed for a few points in the neighbourhood of the dominant period on each of the days, were found to fit the theoretical curve reasonably well.

AD-617 530 Div. 2/4
CFSTI Prices: HC$3.00 MF$0.75

Aeronautical Chart and Information Center, St. Louis, Mo.
GEODESY FOR THE LAYMAN.
Revised ed.,
by R. K. Burkard. Nov 64, 99p
Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only. Revision of reports dated Oct 59 and Sep 62.

Descriptors: (*Geodesics, Reviews), Gravity, Surveying, Special functions(Mathematical), Instruction manuals, Air Force research.

The use of intermediate and long range rockets and missiles requires that the distance and direction from launch site to target be accurately known. The science of geodesy can help to provide this information. The basic principles of geodesy and geodetic surveying are presented in an elementary form. The formation of geodetic datums is introduced and the necessity of connecting or joining datums is discussed. Methods used to connect independent geodetic systems to a single world reference system are discussed. Particular emphasis is placed on the contribution of the Air Force in developing a World Geodetic System. A chapter on Satellite Geodesy and an appendix on Spherical Harmonics have been added in the present edition. (Author)

AD-617 554 Div. 2/8
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ. New York.
SELECTED GREAT BASIN PLAYA CLAYS.
Scientific rept.,
by Necip Guven and Paul F. Kerr. Feb 65, 42p
Rept. no. SR-4
Contract AF19 604 8387, Proj. 8623, Task 862302
AFCRL 65-131
Unclassified report

Descriptors: (*Clay, Sedimentation), (*Stratigraphy, Clay), Clay minerals, Silicates, Aging(Materials), Salts, Particle size, X-ray diffraction analysis, Chemical analysis.

Mineralogical studies of samples from Deep Springs Playa, Calif., Mud Lake and Humboldt Playa, Nevada, Sevier Playa, Utah and the Animas Playa, New Mex., indicate that the mica-type clay minerals illite, vermiculite, and montmorillonite are prominent in these playa crusts. These widely separated localities suggest a general distribution. The weathering of the mica-type layer silicates results in the development of intensive heterogeneity of lattice layers along the c-direction. The continuous scattering in the lower angle region 2θ = 4-8.8 degrees shows gradual transitions between mica-type layers with different basal spacings. Further, there is an intensive disorder in a-b planes of many layers, i.e., random displacements of the layers causing 'continuous scattering' accompanying the normal Bragg reflections. The b-dimensions and the high MgO+FeO+Fe2O3 contents of the mica-type layers indicate their derivation from tetrasilicic members of the dioctahedral mica-type layers. The existence of sensitive layers like those of vermiculite and montmorillonite in the playas is important in explaining the physical behaviour of the surface of the playas. These layers exfoliate when dried and also expand with an increase in humidity. (Author)

AD-617 560 Div. 2/8, 25/2
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York.
WEATHERING EFFECTS ON THE STRUCTURES OF MICA-TYPE CLAY MINERALS.
Scientific rept.,
by Necip Guven and Paul F. Kerr. Feb 65, 40p
Rept. no. SR-2
Contract AF19 604 8387, Proj. 8623, Task 862302
AFCRL 65-129
Unclassified report

Descriptors: (*Mica, Degradation), (*Clay minerals, Degradation), Utah, Soils, Silicates, Crystal lattices, Crystal substructure, X-ray diffraction analysis, Silicon compounds, Aluminum compounds, Magnesium compounds, Iron compounds, Oxides.

Mica-type clay minerals are subjected to an intensive weathering process in the basin of the Willard Reservoir, north of Ogden, on the playa margin of Great Salt Lake. Weathering attacks the interlayer region of the layer lattice silicates most intensively where the bonds are weakest. A continuous scattering in the lower angle region of the (001) - reflection with some sharp superimposed maxima shows the heterogeneity along the c-axis of the mica-type layers; it also shows the genetic relation between the mica-type layers with different basal spacings. The pronounced continuous scattering accompanying the (02,11) diffraction band on the Guinier photographs and the absence of (hkl) reflections show that the layer silicates in the Willard clays possess an intensive disorder in their a-b planes. The values of the b-dimensions, high SiO2/Al2O3 ratios and appreciable amounts of MgO + FeO + Fe2O3 indicate the mica-type layers are possibly derived from tetrasilicic members of dioctrahedral mica. The latter are often overlooked because of their easy alteration. (Author)

AD-617 561 Div. 2/8, 4/2, 25/2
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York.
THE HYDRIDE METHOD FOR THE RAPID DETERMINATION OF 'FREE' WATER IN MINERALS.
Scientific rept.,

by Necip Guven and Paul F. Kerr. Feb 65, 21p
Rept. no. SR-3
Contract AF19 604 8387, Proj. 8623, Task 862302
AFCRL 65-130
Unclassified report

Descriptors: (*Minerals, Water), (*Hydrates, Chemical analysis), Calcium compounds, Hydrides, Hydroxides, Moisture, Soils, Chemisorption, X-ray diffraction analysis.

A rapid procedure for the determination of 'free' water in minerals is described which makes use of the reaction: CaH2 + 2H2O yields Ca(OH)2 + 2H2. The pressure change caused by H2 in the reaction is measured and the corresponding moisture content calculated. Parallel determinations using oven drying were made in order to show the differences between the two methods. The hydride procedure measures only 'free' water whereas the conventional heating method includes both 'free' water and water of 'activated' adsorption and/or water of hydration involving adsorption energies greater than 5-10 Kcals per mole. (Author)

AD-617 573 Div. 2/8, 4/4, 25/2

McMaster Univ., Hamilton (Ontario).
NMR STUDIES OF HYDRATED SODIUM TETRABORATE MINERALS. II. Na 23 SITES IN BORAX AND TINCALCONITE,
by J. D. Cuthbert and H. E. Petch. 1 May 653, 7p
Unclassified report

Research supported by Defence Research Board, Ottawa (Ontario).
Pub. in Journal of Chemical Physics v39 n5 p1247-52 Sep 1 1963 (Copies not available to DDC or Clearinghouse customers).
See also AD-617 474.

Descriptors: (*Sodium compounds, Borates), (*Borates, Nuclear magnetic resonance), (*Sodium, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Borates), Minerals, Hydrates, Single crystals, Quadrupole moments, Symmetry(Crystallography), Electric fields, Tensor analysis, Canada.

The quadrupolar splitting of the Na23 nuclear magnetic resonance signal was studied in single crystals of borax, Na2B4O7.10H2O, and tincalconite, Na2B4O7.5H2O, placed in magnetic fields of 7536 and 5645 G, respectively. The resonance spectra show that the sodium atoms in both minerals occupy special positions with two unique sites in borax and three in tincalconite. The electric quadrupole coupling constants eqQ/h and asymmetry parameters at these sites were determined. The orientations of the principal axes of the electric field gradient tensors for these sites and their symmetry-related sites were also determined. (Author)

AD-617 618 Div. 2/10, 2/5
CFSTI Prices: HC$2.00 MF$0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
MOVEMENT STUDIES BY SEISMIC SOUNDINGS, GREENLAND ICE SHEET.
Research rept.,
by Hans Roethlisberger, Charles R. Bentley, and Hugh Bennett. Apr 65, 33p Rept. no. RR-161
Proj. 8 66 02 400, Task 1V014501B52A31
Unclassified report

Descriptors: (*Seismology, Glaciers), (*Glaciers, Seismology), Motion, Ice, Greenland, Seismic waves, Reflection, Experimental data, Tables, Graphics.

A detailed seismic reflection survey was carried out at Site 2, Greenland (76 deg 59 min N, 56 deg 05 min W) in 1956 in a rectangle 3160 x 2400 ft (963 x 732 m). The survey was repeated in 1959 in the same area, which had been marked by bamboo poles. The results were essentially the same, indicating that the surface had probably not moved much in the 3-year period. However, the reflection records were not of sufficiently high quality to give an accurate estimate of the possible shift, leaving an uncertainty of the order of 50 to 100 m in the direction of the dip of sub-surface (SW) and more in the direction of the strike. It is estimated that under more favorable conditions the method should give an accuracy of 30 to 50 m. (Author)

AD-617 634 Div. 2/9

Scripps Institution of Oceanography, Univ. of California, La. Jolla.
RARE GASES IN PACIFIC OCEAN WATER,
by E. Mazor, G. J. Wasserburg, and H. Craig.
4 Aug 64, 5p
Contract Nonr221623, Proj. NR083 005
Unclassified report

Pub. in Deep-Sea Research v11 p929-32 1964
(Copies available only to DDC users).

Descriptors: (*Helium group gases, Sea water), (*Sea water, Gas analysis), (*Gas analysis, Sea water), (*Oceanology, Gas analysis), Pacific Ocean, Helium, Neon, Krypton, Xenon, Geochemistry.

Concentrations of helium, neon, argon, krypton, and xenon were measured in some S. Pacific waters. For the latter four gases the observed concentrations are generally consistent to abqut ± 10% with concentrations expected for solubility equilibrium with the atmosphere at the observed water temperatures. (Author)

AD-617 676 Div. 2/4, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SYNCHRONOUS OBSERVATIONS OF MAN-MADE EARTH SATELLITE ECHO-1 FOR GEODETIC PURPOSES,
by D. E. Shchegolev, A. G. Masevich, and B. G. Afanasev. 30 Jun 65, 10p
Rept. no. FTD-TT-65-313
TT 65-62590
Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR, Vestnik, v34 n7 p74-7 1964.
Available copy will not permit fully legible reproduction.

Descriptors: (*Astronomical geodesics, Satellites-(Artificial)), (*Satellites(Artificial), Astronomical geodesics), (*Geodesics, Astronomical geodesics), Position finding, Trigonometry, Analytic geometry, USSR.

AD-617 683 Div. 2/6, 2/7
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CONNECTION OF BRIEF PERIODIC OSCILLATIONS (KPK) OF THE TERRESTRIAL ELECTRAMAGNETIC FIELD WITH AURORA POLARIS ILLUMINATION

INTENSITY VARIATIONS,
by R. G. Skrynnikov. 2 Jul 65, 18p
Rept. no. FTD-TT-65-112
TT 65-62597

Unclassified report

Unedited rough draft trans. of mono. Issledovanie Geofizicheskikh Yavlenii Elektromagnitnogo Kompleska v Vysokikh Shirotakh, n. p., 1964 p29-38.

Descriptors: (*Terrestrial magnetism, Aurorae), (*Aurorae, Terrestrial magnetism), Geophysics, Magnetic fields, Meteorological phenomena, Illumination, Intensity, Oscillation, USSR.

AD-617 746 Div. 2/10, 6/7
CFSTI Prices: HC$2.00 MF$0.50

Princeton Univ., N. J.
THEORETICAL CALCULATION OF THE SPECTRUM OF FIRST ARRIVALS IN LAYERED ELASTIC MEDIA,
by Robert A. Phinney. Jun 65, 49p
Contract AF49 638 1243, ARPA Order 292-63

Unclassified report

Rept. on Research In Geophysics (Seismology).

Descriptors: (*Seismic waves, Distribution), Signals, Numerical analysis, Theory, Transformations (Mathematics), Integration, Elasticity.

A practical method for the calculation of the spectral parameters of first-arriving signals in seismology has been the object of much theoretical work in recent years. The difficulty has been in the fact that the first arrival usually behaves as an imperfectly trapped mode. A practical technique is proposed. By a change of variable, the twice transformed solution is separated into a product of the form f(u).e raised to the -iuR power. This can be integrated with respect to the phase variable u, using standard quadrature methods, with the real part of u changing most rapidly along the integration path. By making the frequency complex, it is possible to displace any singularities away from the vicinity of the contour. This gives the spectrum of the signal as viewed through an exponentially decaying time window, making it possible to work with the first arrival by itself. (Author)

AD-617 762 Div. 2/2, 8/2, 30/2
CFSTI Prices: HC$3.00 MF$0.50

Research Labs. Div., Bendix Corp., Southfield, Mich.
AUTOMATED ANALYTICAL STEREOPLOTTER.
Technical documentary rept. for 1 Nov 63-30 Jun 64,
by Walter E. Chapelle. Jun 65, 52p
Rept. no. 2693
Contract AF30 602 2942, Proj. 5569, Task 556901
RADC TDR-64-405

Unclassified report

See also AD-432 075.

Descriptors: (*Stereoscopic map plotters, Automatic), Electronic equipment, Computers, Stereoscopic photography, Terrain, Terrain models, Map projection, Optical scanning, Photographs.

The report describes the development of an automated version of an AS-11A analytical stereoplotter. The system utilizes electronic image correlation in conjunction with the AS-11A control computer to automatically produce contour and profile charts. The equipment accommodates frame or panoramic photography, either vertical or convergent. The maximum rates of contouring or profiling are 10 millimeters per second. Maximum terrain slope accommodated is 45 degrees. Capability is provided for automatic orientation of stereo-models and for visual monitoring during automatic operation. (Author)

09. Electronics and Electrical Engineering

AD-617 235 Div. 9/6

Polytechnic Inst. of Brooklyn, N. Y.
SIMILARITY IN AXISYMMETRIC VISCOUS FREE MIXING WITH STREAMWISE PRESSURE GRADIENT,
by M. H. Steiger. 6 May 64, 1p
Grant AF AFOSR1 63
AFOSR 65-0918

Unclassified report

Pub. in AIAA Journal (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Axially symmetric flow, Mathematical analysis), Viscosity, Incompressible flow, Pressure.

AD-617 238 Div. 8/1, 25/3

California Univ., Berkeley.
QUASISTATIC ANALYSIS OF WAVES IN A PLASMA-FILLED WAVEGUIDE,
by J. E. Scharer and A. W. Trivelpiece. 30 Jan 64, 2p
Contract AF19 628 324; Grant AF AFOSR139 63
AFOSR 65-0909

Unclassified report

Pub. in Journal of Applied Physics v36 n3 p318-9 Jan 1965(Copies not available to DDC or Clearing-housr customers).

Descriptors: (*Waveguides, Plasma oscillations), (*Cyclotron waves, Plasma medium), (*Plasma oscillations, Waveguides), Field theory, Mathematical analysis.

AD-617 251 Div. 8/1
CFSTI Prices: HC$2.00 MF$0.50

Illinois Univ., Urbana. Engineering Experiment Station.
ENERGY CONSIDERATIONS IN OPEN AND CLOSED WAVEGUIDES.
Technical rept.,
by S. Laxpati and R. Mittra. Jun 65, 40p
Antenna Lab. rept. no. 65-3, TR-6
Contract AF19 628 3819, Proj. 4600, Task 460004
AFCRL 65-222

Unclassified report

Descriptors: (*Waveguides, Energy), Electromagnetic waves, Propagation, Power, Helical antennas, Antenna configurations.

Enery relations derived for a lossless closed uniform and periodic structure show that the total complex Poynting vector integrated over the cross section is identically zero for the case of an arbitrary complex wave. These results are also applicable to open structures provided certain conditions are satisfied. The application of these results in the field of leaky wave antennas is discussed. Two illustrative examples, those of the sinusoidally modulated reactance surface and the sheath helix, are worked out. It is shown that although the slope of the k-beta curve can no longer be associated with the direction of net power flow, the knowledge of the slope may still be helpful in selecting certain modes for representing a given source. (Author)

AD-617 260 Div. 8/3, 8/2
CFSTI Prices: HC$2.00 MF$0.50

Polytechnic Inst. of Brooklyn, N. Y.
INTERPOLATION ON THE REAL FREQUENCY AXIS.
Interim rept.,
by Lowell I. Smilen. May 65, 26p
Rept. no. PIBMRI-1211-64
Contract AF30 602 2668, Proj. 8505, Task 850501
RADC TR-65-128

Unclassified report

Descriptors: (*Electrical networks, Synthesis), Electrical impedance, Microwave networks, Functions, Numerical analysis, Matrix algebra, Circuits, Transmission lines.

This paper presents a systematic procedure, capable of being programmed on a computer or developed graphically, for realizing a positive-real function which takes on a prescribed set of values on the real frequency axis. In the course of doing this, the lack of uniqueness of this function was demonstrated. Several alternate approaches were explored and by using the relationships developed many others can be obtained. Particularly in the design of transmission line circuits, it is necessary to explore the various possibilities in order that a circuit capable of construction at microwave frequencies is achieved. In designs using transmission lines where minimizing the degree is not the prime concern, it is desirable to cascade a length of line between interpolation sections. Since the transmission line is a lossless two-port, the positive reality is not affected and an additional degree of freedom (the characteristic impedance of the line) is obtained. A problem yet to be solved relates to the question of when can an impedance be realized which interpolates to the required set of values and is synthesized as a lossless two-port, requiring no coupled coils, terminated in a resistor. (Author)

AD-617 285 Div. 7/3
CFSTI Prices: HC$2.00 MF$0.50

North Dakota Univ., Grand Forks.
DESIGN OF SERIES SILICON-CONTROLLED RECTIFIER INVERTER.
Master's thesis,
by William L. Hendren. Jun 65, 47p

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Inverters, Design), (*Rectifiers, Inverters), (*Silicon, Inverters), Switching circuits, Timing circuits, Voltage, Inverter circuits.

There are two methods by which switches of similar devices can be used to generate AC. In a parallel inverter circuit, a constant current source is used and the switches are used to pass square waves of constant current. In a series inverter circuit, a constant voltage source is used and the switches are used to pass half-sine waves of current. A series inverter in which silicon-controlled rectifiers were used as the switching elements was designed and constructed for this thesis. Silicon-controlled rectifiers can be used for generating high power frequencies up to 10 kilocycles per second. However, because of cost considerations, the series inverter that was designed was a low power 400 cycles per second inverter. The same design criteria can be used to generate much higher frequencies and outputs of several KVA. An important requirement for the inverter is that

the timing pulses for one silicon-controlled rectifier occur midway between the timing pulses for the other silicon-controlled rectifier. A bistable multivibrator triggered by a unijunction transistor relaxation oscillator of 800 pulses per second was used to satisfy this requirement. A transformer was connected in series with the series resonant circuit. The silicon-controlled rectifiers switched half-sine waves of current alternately through the primary and the output sine wave of voltage was taken from the secondary. (Author)

AD-617 286 Div. 30/2
CFSTI Prices: HC$3.00 MF$0.75

North Dakota Univ., Grand Forks.
ANALOG COMPUTER SIMULATION AND PHASE PLANE ANALYSIS OF AUTONOMOUS NONLINEAR SECOND-ORDER SYSTEMS.
Master's thesis,
by William Thornton. Jun 65, 77p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Control systems, Analysis), Analog computers, Simulation, Trajectories, Differential equations, Circuits, Programming(Computers), Nonlinear differential equations.

AD-617 287 Div. 30/2, 30/3
CFSTI Prices: HC$3.00 MF$0.75

North Dakota Univ., Grand Forks.
STABILITY IN DESIGN OF FEEDBACK CONTROL SYSTEMS.
Master's thesis,
by Bernard P. Randolph. Jun 65, 86p
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Control systems, Feedback), (*Servomechanisms, Design), Stability, Graphics, Mathematical analysis, Systems engineering.

The purpose of the study is to consider the best method in the design of automatic feedback control systems.

AD-617 298 Div. 30/2
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana.
SYNTHESIS OF THREE-LEVEL LOGIC CIRCUITS WITH APPLICATION TO A RADIX THREE COMPUTER ARITHMETIC UNIT.
Master's thesis,
by Thomas Alois Rozmarich. 28 May 65, 61p
Unclassified report

Descriptors: (*Computer logic, Synthesis), (*Circuits, Computer logic), Digital computers, Switching circuits, Design, Control sequences.

It is known that the use of a larger radix in a digital computer will result in the speeding up of arithmetic operations where the number of recursive steps is reduced with a larger radix. One problem encountered when going to higher radices involves the voltage representation of the digital values, which may lead to the need of additional circuitry just to be able to distinguish between the various voltage levels. Ternary logic has been suggested as a means of controlling timing in sequential circuitry. Adder circuits are presented for use in a radix three computer, and, also three level logic operations which have a more general application.

AD-617 324 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Electronics Research Lab., Univ. of California, Berkeley.
STUDY OF CROSSED-FIELD AMPLIFIERS.
Quarterly progress rept. no. 6, 15 Oct 64-15 Jan 65,
by T. Van Duzer, N. R. Mantena, R. Y. C. Ho, R. A. Rao, and A. Sasaki. 15 Jan 65, 8p
Contract DA36 039AMC02164E, Proj. 3a99 13 001
Unclassified report

See also AD-448 492.

Descriptors: (*Crossed field devices, Microwave amplifiers), (*Microwave amplifiers, Crossed field devices), Electromagnetic shielding, Electron guns, Electron beams, Backward-wave amplifiers, Noise(Radio), Cathodes(Electron tubes), Magnetrons, Space charges.

Contents:
Shielded-gun crossed-field amplifier; Backward-wave noise-figure studies; Noise-figure studies on forward-wave crossed-field amplifier; Cathode-region studies on crossed-field tubes; Characteristics of the smooth-bore magnetron.

AD-617 326 Div. 8/7, 26/2
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Los Angeles. Western Management Science Inst.
INFORMATION AMOUNT AS A MEASURE CORRECTING ONE'S PRIOR PROBABILITY.
Working paper,
by Koichi Miyasawa. Apr 65, 55p
Rept. no. WP-73
Contract Nonr23375, Task NR047 041
Unclassified report

Descriptors: (*Communication theory, Probability), Decision theory, Game theory, Statistical analysis, Management engineering.

Several kinds of definition of information amount or information value have been proposed by several authors. The author attempts to define information amount as a measure of correcting one's prior probability distribution on the state space. By combining two informations concerning the same decision partition, it is shown that the combined information has a greater information amount than the separate ones. When two different types of informations - in the sense they are concerned with different decision sub-partitions of the ultimate decision partition - it is shown how they should be aggregated to obtain a more informative information concerning the ultimate decision partition. (Author)

AD-617 344 Div. 30/2, 8/7
CFSTI Prices: HC$2.00 MF$0.50

Mitre Corp., Bedford, Mass.
PAT, A LANGUAGE FOR PROGRAMMING AND MAN-COMPUTER COMMUNICATION,
by R. Silver and C. Wells. Jun 65, 38p
Rept. no. W-07191
Contract AF19 628 2390, Proj. 508
ESD TDR-64-636 Unclassified report

Descriptors: (*Programming(Computers), Programming languages), (*Programming languages, Programming(Computers)), Compilers, Control sequences, Communication theory.

PAT is a computer language of the macro-assembly type. The program, which translates PAT into computer code, is designed to be used not only as a compiler of programs, but as a symbolic interface between a user and a computer. In this latter capacity, it can serve to interpret commands and accept command definitions for such programs as a text editor, on-line debugger, or simulated desk calculator. The language and the translator have been designed to allow the structure of the translator itself to be modified by certain definitions encountered during the translation process. The rules for defining symbols and referring to them have been organized to facilitate combining independently written programs into a single unit. (Author)

AD-617 363 Div. 8/7, 30/2
CFSTI Prices: HC$1.00 MF$0.50

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
A CONTINUOUS KIEFER-WOLFOWITZ PROCEDURE FOR RANDOM PROCESSES,
by David J. Sakrison. 26 Mar 63, 10p
Unclassified report

Research supported in part by U. S. Army Signal Corps, Air Force Office of Scientific Research and Office of Naval Research, Washington, D. C.

Descriptors: (*Stochastic processes, Theorems), (*Communication theory, Stochastic processes), Numerical analysis, Statistical functions.

AD-617 373 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
L-BAND AMPLIFIER DESIGN FROM TWO-PORT PARAMETERS.
Technical rept.,
by V. Gelnovatch and G. E. Hambleton. Apr 65, 26p Rept. no. ECOM-2588
Proj. 1P6 22001A056, Task 1P6 22001A056 04
Unclassified report

Descriptors: (*Transistors amplifiers, L-band), Microwave amplifiers, Coupling circuits, Design, Gain, Admittance, Graphics.

Transistors now possess the capability to operate in the L-band region. This report describes an amplifier design using y-parameters measured at the design frequency and the fabrication of a laboratory amplifier model. Design calculations and performance data are presented. (Author)

AD-617 401 Div. 8/2, 26/1
CFSTI Prices: HC$4.00 MF$1.00

Crystalonics, Inc., Cambridge, Mass.
PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
Final rept.
1964, 148p
Contract DA36 039AMC01483E
See also AD-613 068. Unclassified report

Descriptors: (*Transistors, Manufacturing methods), Reliability(Electronics), Silicon, Processing, Instruction manuals, Quality control, Diffusion, Oxidation, Cleaning, Bonding, Packaging, Performance(Engineering), Life expectancy.

The report is the final engineering report of a production engineering measure for the improvement of production techniques to increase the reliability of a silicon Field-Effect Transistor line. Under this contract, work was performed in specific areas resulting in improved processing techniques. Process operation instructions are included in Volume I. Program conclusions based upon the work performed are also provided in Volume I together with a narrative discussing all aspects of the program. All test data and information are summarized in Volume II. (Author)

AD-617 404 Div: 30/2, 15/1
CFSTI Prices: HC$4.00 MF$1.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
MATHEMATICAL AUTOMATA THEORY. VOLUME I. FINITE AUTOMATA.
Final rept. for 12 Feb 64-11 Feb 65,
by C. C. Elgot, J. Thatcher, E. Wagner, J. Mezei, and J. Wright. May 65, 150p
Contract AF30 602 3340, Proj. 5581, Task 558104
RADC TR-65-113, V1
Unclassified report

See also AD-617 410.

Descriptors: (*Automata, Theory), (*Mathematical logic, Automata), Decision theory, Computers, Digital computers, Metamathematics, Algebras, Computer logic, Groups(Mathematics).

Three broad areas were investigated: (1) the use of formal languages to describe the nature and behavior of finite automata; (2) the development of algebraic approaches to the description of finite automata, automata behavior, and the classification of automata; (3) the development of global models (models that, in effect, consider a digital computer as-a-whole) and computability theory. (Author)

AD-617 410 Div. 30/2, 15/1
CFSTI Prices: HC$5.00 MF$1.00

Thomas J. Watson Research Center, Yorktown Heights, N. Y.
MATHEMATICAL AUTOMATA THEORY VOLUME II. GLOBAL MODELS AND COMPUTABILITY THEORY.
Final rept.,
by C. C. Elgot, J. Mezei, and J. Thatcher. May 65, 175p
Contract AF30 602 3340, Proj. 5581, Task 558104
RADC TR-65-113 V2
Unclassified report

See also AD-617 404.

Descriptors: (*Automata, Theory), (*Mathematical logic, Automata), Decision theory, Computers, Digital computers, Metamathematics, Algebras, Computer logic.

AD-617 412 Div. 30/2, 1/1
CFSTI Prices: HC$4.00 MF$0.75

Texas Univ., Austin.

ADAPTIVE THRESHOLD LOGIC.
Master's thesis,
by Richard Gene Chappell. May 65, 107p
Contract AF33 608 1121
Unclassified report

Descriptors: (*Adaptive control systems, Computer logic), (*Computer logic, Adaptive control systems), Gates(Circuits), Magnetic cores, Magnetic tape, Design, Operation.

The design and construction of a 16 variable threshold logic gate with adaptable weights is described. The operating characteristics of tape wound magnetic cores when used as an analog memory element are presented. Magnetic properties of the cores are discussed and a test procedure is proposed which will simplify the determination of optimum parameter values for an adaptive weight. Test results are shown for several different core materials and sizes as well as for the 16 input adaptive threshold logic gate. (Author)

AD-617 424 Div. 8/2
CFSTI Prices: HC$2.00 MF$0.50

Siliconix, Inc., Sunnyvale, Calif.
TRANSISTOR, FIELD EFFECT, INSULATED GATE, 100 Mc AMPLIFIER.
Quarterly progress rept. no. 1, 1 Dec 64-1 Mar 65,
by Gerald L. Parker. 1 Mar 65, 27p
Contract DA28 043AMC00436E, Proj. 1P6 22001A056 01
Unclassified report

Descriptors: (*Transistor amplifiers, Very high frequency), (*Transistors, Performance(Engineering)), Gain, Radiofrequency power, Semiconductors, Oxides, Resistance(Electrical), Electrical impedance, Aluminum, Silicon compounds, Processing.

Design, manufacture, and evaluation of two study devices, the MOS I and MOS II insulated-gate field-effect transistors, have been completed. Effect of masking tolerances and high-frequency properties have been evaluated; data on d-c and a-c characteristics are recorded and compared to theory. It was found that the major limitation to device performance was the gate-source distributive resistance that charges the gate-source capacitance. A series resistance of approximately 15 ohms transforms into a parallel resistance of 17K at 100 mc. This reduces the real part of the input impedance to 6K typical. This problem will be solved by redesigning the gate bonding pad and shortening the gate length in MOS III to meet the required 20 db power gain for a 100 mc amplifier. (Author)

AD-617 425 Div. 8/2

Air Force Cambridge Research Labs., Bedford, Mass.
FREQUENCY STABILITY IN DIELECTRIC RESONATORS.
Instrumentation papers,
by M. R. Stiglitz and J. C. Sethares. 14 Dec 64,
10p Rept. no. IP-62, AFCRL 65-355
Proj. 4600, Task 460003
Unclassified report

Pub. in Institute of Electrical and Electronics Engineers. Proceedings, v53 n3 p311-2 Mar 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Resonators, Dielectrics), (*Frequency, Stability), Frequency shift, Microwave frequency, Cavity resonators.

Rutile, strontium titanate, and other low-loss materials of high-dielectric constant, show high Q resonances in the microwave range. Until now, dielectric resonators have been of limited usefulness because they are inherently temperature-unstable. The resonant frequency is highly temperature-dependent; and high cavity Qs, which result in absorption of microwave power at resonance, cause cavity-heating and frequency drift. Thermal stability can be achieved through heat-sinking. The dielectric resonator is imbedded in a boron-nitride (BN) slab, which is in good thermal contact with the waveguide walls, and cw powers in excess of 100 mW applied to the resonators. Frequency stability is reached in 15 minutes. Heat-sinking is successful at room temperatures as well as at cryogenic temperatures. (Author)

AD-617 484 Div. 8/7

Cooley Electronics Lab., Univ. of Michigan, Ann Arbor.
ON THE DETECTION OF A SIGNAL KNOWN EXCEPT FOR PHASE.
Revised ed.,
by Richard A. Roberts. 1 Sep 64, 7p
Unclassified report

Pub. in IEEE Transactions on Information Theory vIT11 n1 p76-82 Jan 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 30 Mar 64.

Descriptors: (*Communication theory, Demodulators), (*Demodulators, Communication theory), Signals, Phase measurement, Phase detectors, Decision theory, Sequential analysis.

The optimum (likelihood ratio) design and evaluation of a detection receiver is presented for a signal known except for a class of unimodal distributed phases. Sequential and nonsequential realizations are presented. From the evaluation, we conclude that phase angle information which locates the phase to within 65 degrees is, approximately, for detection, a phase known exactly. (Author)

AD-617 501 Div. 30/2, 25/6

Computer Sciences Lab., Northwestern Technological Inst. Evanston, Ill.
SYSTEMATIC DESIGN OF CRYOGENIC LOGIC CIRCUITS,
by C. C. Yang and J. T. Tou. 1964, 12p
Unclassified report

Pub. in Proceedings, Fall Joint Computer Conferences p651-62 1964.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Computer logic, Design), (*Cryogenics, Computer logic), Superconductors, Data storage systems, Pattern recognition, Switching circuits, Relays.

AD-617 516 Div. 30/2
CFSTI Prices: HC$3.00 MF$0.75

Univac, Blue Bell, Pa.
INVESTIGATION OF LOGIC CIRCUIT COMPLEXES, RELIABILITY AND FAULT-MASKING IN n-VARIABLE NOR TREES.
Scientific rept. no. 1, 15 Mar 64-15 Mar 65,
by Marion S. Dunning, Bernard Kolman, and Leon Steinberg. 15 Apr 65, 90p
Contract AF19 628 4051, Proj. 4641, Task 464104
AFCRL 65-295
Unclassified report

Descriptors: (*Reliability(Electronics), Computer logic), (*Computer logic, Reliability(Electronics)), Circuits, Gates(Circuits), Malfunctions, Modules-(Electronics), Probability.

In the preceding final report the n-variable NOR tree was developed and some of its properties were studied. This tree will be referred to as the general n-variable tree. If any of the NORs are not operating correctly, then at least one of the logical functions will not be executed correctly for all assignments of values to the variables. The first part of this paper develops three methods for masking faults in the general tree by adding additional NORs. These yield restoring trees, quadded trees, and generalized majority trees. The next section discusses three different definitions of reliability: system reliability, function reliability and signal state reliability. Methods for computing these reliabilities as functions of the failure probabilities of the diodes and transistors which compose the NOR elements for restoring, quadded and general trees are presented. Since system reliability is the most important type of reliability to the circuit designer, this paper next considers the computation of system reliability for the general, quadded and restored trees. The computation is simple for the general tree. However, for the quadded and restored trees, compensating errors make the computation extremely difficult. In these cases upper and lower bounds for the system reliability are computed. The computations are carried out for n = 1, 2, 3, 4, and the curves provide comparisons between the two fault masking techniques being considered, as well as comparisons between the upper and lower bounds for the system reliabilities. Curves are also drawn for n = 1, 2, 3, 4 of the system reliability for restored quadded and general trees as a function of the reliability of a NOR element. (Author)

AD-617 538 Div. 8/4
CFSTI Prices: HC$3.00 MF$0.75

ITT Industrial Labs., Fort Wayne, Ind.
RESEARCH AND DEVELOPMENT TO IMPROVE THE RESOLUTION OF IATRON DIRECT VIEW STORAGE TUBES.
Summary development rept., phase 2 for 2 Mar 64-2 Jun 65, by R. W. Hunter. 1 Jul 65, 83p Serial no. 3304
Contract NObsr87264, Proj. SR00803, Task 9487
Unclassified report

See also AD-609 744.

Descriptors: (*Storage tubes, Resolution), (*Cathode ray tubes, Storage tubes), Electron tube parts, Brightness, Cathode ray screens, Electron beams, Electron guns, Electron lenses, Focusing, Manufacturing methods, Performance(Engineering), Electrodes.

Six final sample tubes were built during the quarterly. Four of these tubes are physically like type FW-267. The other two tubes were also like the FW-267 except the writing gun neck was 3-inches longer to obtain a smaller writing spot size. All tubes contained the improved writing guns, 500 mesh 50-percent transmission collector screens, and 1000 mesh 25-percent transmission backing electrodes. All tubes had a 0.150 inch backing electrode-to-viewing screen spacing.

AD-617 539 Div. 8/2
CFSTI Prices: HC$1.00 MF$0.50

Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
HIGH POWER VARACTOR FOR UHF TRANSMISSION.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 65, by G. A. Louis. 31 Mar 65, 23p
Contract DA28 043AMC00278E, Proj. 1P6 22001A056
See also AD-615 329. Unclassified report

Descriptors: (*Varactor diodes, Ultrahigh frequency), Silicon, Crystals, Epitaxial growth, Diffusion, Impurities, Semiconductors, Oxides, Dies, Packaging, Manufacturing methods.

The report describes the epitaxial layer structure and its evaluation and control. The theory covering the diffusion of impurities during epitaxial growth is discussed. Improved low temperature oxide passivation is described. Comparisons are made between unpackaged and packaged die characteristics. Minor changes in the test circuit are noted. (Author)

AD-617 543 Div. 8/2, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electric Products, Inc., Woburn, Mass. Semiconductor Div.
DEVELOPMENT OF EPITAXIAL TECHNOLOGY FOR MICROELECTRONICS AND LARGE AREA DEVICE APPLICATIONS.
Quarterly rept. no. 12, 1 Mar-31 May 65, by P. Wang, R. Yee, and J. Eknaian. 1 Jun 61, 33p
Contract NObsr85431, Proj. SR0080302, ST9348
Unclassified report

Descriptors: (*Crystal growth, Silicon), (*Epitaxial growth, Silicon), (*Silicon, Epitaxial growth), (*Semiconductors, Epitaxial growth), Crystals, Impurities, Oxides, Films, Electronic switches, Transistors, Photosensitivity, Microminiaturization(Electronics), Manufacturing methods, Performance(Engineering).

Work has essentially been completed on PNPN light-sensitive matrices made by both oxide-masked epitaxy and by epitaxy-diffusion techniques. Matrices fabricated with the latter technique are considerably more sensitive, turning on with only 0.2 foot-candles of incident illumination. (This sensitivity can be reduced with a subsequent improvement in uniformity from unit to unit.) Measurement methods are described, and light sensitivity results are given for both types of units. A search for the best method for making matched NPN-PNP transistor pairs has begun. A discussion of the pros and cons of all known methods is presented, with the conclusion that the beam lead process offers the most practical way to achieve such devices. A slowing down of this portion of the program will result to allow related company-funded beam lead developments to catch up with device fabrication developments under the contract. (Author)

AD-617 545 Div. 8/2
CFSTI Prices: HC$7.00 MF$1.75

Western Electric Co., Laureldale, Pa.
PRODUCTION ENGINEERING MEASURE. MECHANIZATION FOR 2N559 AND 2N1094 TRANSISTORS. PHASE 2.
Final engineering rept. for 1 Jan 63-31 Dec 64, by M. N. Reppert. 31 Dec 64, 346p
Contract DA36 039SC72729
Unclassified report

See also AD-609 442.

Descriptors: (*Semiconductor devices, Production), (*Transistors, Manufacturing methods), Machines, Machine tools, Bonding, Electric wires, Ultrasonic radiation, Silanes, Coatings, Gold, Plating, Cleaning, Chemical milling, Reliability(Electronics), Germanium alloys, Silicon alloys, Guided missile components.

Progress is reported on the design and development of high-volume production equipment for use in the manufacture of semiconductor devices.

AD-617 563 Div. 8/2, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Texas Instruments, Inc., Dallas. Apparatus Div.
MICROELECTRONIC FREQUENCY AND TIME STANDARD.
Quarterly progress rept. no. 4, 1 Apr-1 Jul 65.
15 Jul 65, 13p Rept. no. U4-807240-4
Contract NObsr91352, Proj. SR0080303, Task 9624
Unclassified report

See also AD-613 999.

Descriptors: (*Subminiature electronic equipment, Time-interval counters), (*Frequency, Standards), (*Semiconductor devices, Frequency stabilizers), Timing devices, Crystal oscillators, Circuits, Power supplies, Amplifiers, Design.

The frequency standard oscillator continued to be the major problem during this reporting period. The problems described in the last report with the CR-71/u crystals were solved the latter part of April and tests were begun on the prototype oscillator. All specifications were met except frequency stability over the environmental temperature range of 5 parts per 10 to the 10th power. This problem has been determined to be partly caused by incorrect thermistor location on the inner oven. This was corrected, but a change of 2 parts per 10 to the 9th power still existed. At the time of this report, it appears to be the result of voltage variations caused by a zener diode in the power supply which affects the frequency control varicap. A change to a more stable reference diode appears to have corrected this problem. The remaining portion of the equipment was delayed again due to receipt of the SCN's (semiconductor networks). These were received 27 May 1965. Due to these problems, the delivery of the system will probably be delayed to 1 September 1965. (Author)

AD-617 564 Div. 8/2, 26/1, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Texas Instruments, Inc., Dallas.
PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR.
Quarterly progress rept. no. 3, 31 Dec 64-31 Mar 65,
by C. L. White. 31 Mar 65, 65p Rept. no. 03-65-38
Contract DA36 039AMC03632E, Proj. 74057
Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Microwave equipment, Transistors), (*Germanium, Transistors), Ultrahigh frequency, Environmental tests, Soldering, Life expectancy, Electrical properties, Gain, Noise(Radio), Packaging, Encapsulation, Inductance, Production, Performance(Engineering).

Average value of 1.5 Gc noise figure of improved L-78A devices fabricated by means of a modified emitter alloying process during the first part of the third quarter was 4.4 db compared to approximately 4.8 db for L-78A devices reported in the second quarter. The measured value of the r(b)C(c) product using the G-2 expanded contact pattern is 2.0 psecs compared to previously reported values of 2.5 to 3.0 psecs using the L-78A G-1 contact. Measured value of 1.5 Gc noise figure, corrected for first stage gain, using the new L-78B pattern is typically 4.1 db. The measured value of 3.0 Gc noise figure, uncorrected, is typically 7.2 db with a first stage gain of 4.0 db. The G-2 expanded contact pattern was used in conjunction with the L-78B for fabricating these devices. We are experiencing difficulty in obtaining suitable L-93A masks. The yield of devices fabricated from the L-93A pattern is very poor. As an expedency, we have ordered a new pattern, simpler in design scope than the L-93A mask. The pattern designation is X66. Several important steps have been taken in order to achieve more precise control of evaporated films during fabrication of the PEM device. Characteristics of the Tl-line package are included in this report to show the reduction in common lead inductance that resulted from using two lead wires on the common element of the transistor. Results of operating and storage life test on L-78 and L-78A devices are favorable. Latest environmental testing on L-78A devices remains unfavorable.

AD-617 568 Div. 8/2, 8/3
CFSTI Prices: HC$2.00 MF$0.50

Airtron, Inc., Morris Plains, N. J.
DUPLEXER FOR SIDE-LOOKING RADAR.
Quarterly rept. no. 2, 1 Oct-30 Dec 64,
by Morrell L. King, Donald A. Lepore, J. W. Nielsen, and E. Wantuch. 30 Dec 64, 47p Rept. no. R11-471
Contract DA28 043AMC00280E, Task 1P6 22001A055 04
Unclassified report

Descriptors: (*Radar duplexers, Side-looking radar), (*Side-looking radar, Radar duplexers), Limiters, Microwave equipment, Waveguide circulators, Ferrites, Yttrium, Iron, Garnet.

A three-cavity limiter was designed and constructed in which the middle resonator is a single crystal YIG sphere. High power tests have shown limiting to occur at 50 watts peak, and continuing to a level of 30 KW. A total of fifteen materials were evaluated in the three-port circulator. Peak power measurements were made to a level of 500 KW, one composition exhibits .45 db loss at this level. The phase shift section of the four-port circulator was tested at 200 KW peak power. (Author)

AD-617 575 Div. 8/7

California Univ., Berkeley. Dept. of Electrical Engineering.
SYNTHESIS OF ORIENTED COMMUNICATION NETS,
by D. K. Sen and I. T. Frisch. 1965, 12p
Grant DA ARO D31 124G576
AROD 5177:2
Unclassified report

Pub. in IEEE Symposium on Signal Transmission and Processing p90-101 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Matrix algebra, Communication theory), (*Communication theory, Matrix algebra), Synthesis, Networks, Graphics.

A major unsolved problem is the determination of the necessary and sufficient conditions for realizability of an unsymmetric square matrix with real positive entries as the terminal capacity matrix of an oriented communication net. In this paper two sufficient conditions for realizability are given. A restricted class of matrices named 'maximally distinct' matrices is studied in detail and some interesting results about the structure of realizable, maximally distinct matrices are derived. A necessary and sufficient condition for realizability of this class of matrices is also found and an algorithm for synthesis is developed which directly reduces the given matrix to the branch capacity matrix of its realization. (Author)

AD-617 595 Div. 8/2, 8/3

University of Southern California, Los Angeles. Electronic Sciences Lab.
ON THE THEORY OF LINEAR PASSIVE SYSTEMS,

by J. Meixner. 19 Jun 64, 20p
Grant AF AFOSR496 64
AFOSR 65-0914

Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v17 n4 p278-96 1964 (Copies available only to DDC users).

Descriptors: (*Theorems, Linear systems), (*Electrical networks, Linear systems), Functional analysis, Matrix algebra, Potential theory.

Some theorems on linear passive systems are quoted. Then two subclasses, the relaxation systems of the first and of the second kind, are defined, and various properties of them are derived. Sufficient conditions are given that a linear passive system with a stimulus which is a harmonic function for t>0 will have a response which approaches a harmonic function for t approaching infinity. Finally the representation theorems are derived for vector-valued linear passive systems. (Author)

AD-617 613 Div. 30/2
CFSTI Prices: HC$5.00 MF$1.00

Aurebach Corp., Philadelphia, Pa.
AN APPROACH TO COMPUTER INSTALLATION PERFORMANCE EFFECTIVENESS EVALUATION.
Rept. for Dec 64-Apr 65,
by N. Statland, R. Proctor, J. Zelnick, R. Getis, and J. Anderson. Jun 65, 164p
Rept. no. AUERBACH-1243-TR-2
Contract AF19 628 5035, Proj. 7990, Task 38
ESD TR-65-276

Unclassified report

Descriptors: (*Computers, Performance(Engineering)), (*Data processing systems, Analysis), Effectiveness, Standards, Computer personnel, Programming(Computers), Magnetic tape, Time studies, Systems engineering, Air Force.

The process provides objective measures of performance efficiency based on both quantitative and qualitative data, and provides standards for measuring installation effectiveness. Specifications and characteristics are collected via questionnaires, once and only once, in four categories: computer hardware, extended machine (hardware/software interaction), software evaluation and problem specification. An extension of this measurement of computer system performance provides a rating for the performance of a given software package on a given piece of hardware by comparing the time derived from the hand-tailored coding to the timing resulting from the object program produced by the software. This ratio measures the efficiency of the software on the specific hardware configuration. The aggregate ratios for all the individual performance criteria are used to derive a performance standard for a software system. Algorithms are used to summarize the raw data elements and a computer program will select data elements, make simple arithmetic combinations of these elements into composites, and prepare the data for entry into a statistical analysis. Stepwise multiple regression analysis is utilized to determine the relative significance of various data elements and to calculate their relative weights. (Author)

AD-617 616 Div. 30/2
CFSTI Prices: HC$6.00 MF$1.50

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
INTERACTIONS OF COMPUTER LANGUAGE AND MACHINE DESIGN.
Final rept.,
by H. J. Gray, C. Kapps, W. C. Slemmer, and A. L. Vivatson. May 65, 299p
Contract AF30 602 2994, Proj. 5581, Task 558102
RADC TR-64-511

Unclassified report

Descriptors: (*Computers, Design), (*Programming languages, Feasibility studies), Computer storage devices, Simulation, Performance(Engineering), Effectiveness, Programming(Computers), Real time.

The effort represents the results of contractual efforts to determine by simulation the feasibility of the design of a computer that has the internal ability to (1) interpret any programming language, (2) add items to the programming language which makes the language more useful, (3) use the multi-list procedures of the University of Pennsylvania, (4) use the form of associative memory that can be replaced, without any modification to the rest of the computer, by a truly associative memory at such time as the truly associative memory becomes available, and (5) compile and compute programs written in the programming language. A thorough and complete study and evaluation of the simulated multi-list machine was conducted in order to provide information which was used to predict the performance capabilities, range of application and efficiency of a multi-list organized machine to be built in accordance with the available machine design information. This investigation specified the optimum memory size, register size and interface logic to be used in constructing the actual multi-list organized machine. The report refutes the pragmatism of attempting to design a machine with the internal design capability of interpreting any language as input. (Author)

AD-617 650 Div. 8/7

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
THE POWER DENSITY SPECTRUM OF TELEVISION RANDOM NOISE,
by Thomas S. Huang. 23 Jun 64, 5p

Unclassified report

Pub. in Applied Optics v4 n5 p597-601 May 1965 (Copies not available to DDC or Clearinghouse customers).
Supported by Army, Navy, Air Force, NSF, NIH, and NASA.

Descriptors: (*Television equipment, Noise(Radio)), (*Noise(Radio), Television equipment), Video signals, Signal-to-noise ratio, Communication theory, Mathematical models, Radiofrequency spectroscopy.

The two-dimensional power density spectrum of television random noise is derived in terms of the one-dimensional spectrum of the noise considered as a time function. As an application, an attempt is made to look at the problem of the subjective effect of television noise from a two-dimensional point of view. (Author)

AD-617 693 Div. 8/2
CFSTI Prices: HC$3.00 MF$0.75

Hughes Aircraft Co., Fullerton, Calif.
IMPROVED DELAY LINE TECHNIQUES STUDY.
Final rept.
May 65, 84p Rept. nos. 64HF-0197/A4264, FR-65-14-010
Contract AF30 602 3474, Proj. 4506
RADC TR-65-45

Unclassified report

Descriptors: (*Delay lines, Pulse compression), (*Pulse compression, Delay lines), Bandwidth, Transducers, High frequency, Films, Yttrium, Iron, Garnet, Cadmium compounds, Sulfides.

Dispersive delay lines are a very stable and reliable pulse compression technique. As a result of increased requirements placed on pulse compression systems such as bandwidth, and time-bandwidth products, dispersive delay line techniques must be improved. Improved dispersive delay line technology as applied to pulse compression systems was investigated. Higher frequency of operation, broader bandwidth and greater ease of fabrication were the primary areas of interest. Two dispersive delay line configurations were investigated. The first configuration was a technique based on the dispersive characteristic which results from elastic waves propagating in thin metal strips, and the second configuration was based on slow wave propagation in a yttrium iron garnet. An investigation was undertaken to determine a highly efficient transducer to be used in conjunction with the dispersive delay lines. Vacuum deposited cadmium sulfide transducers proved to be most desirable and successful in constructing delay lines of broad instantaneous bandwidth. (Author)

AD-617 694 Div. 8/4
CFSTI Prices: HC$2.00 MF$0.50

Raytheon Co., Waltham, Mass. Microwave and Power Tube Div.
CROSSED FIELD MICROWAVE TIME DELAY TUBE FEASIBILITY STUDY.
Final rept. for 20 Jul 64-20 Jan 65,
by A. Downing and J. I. Smith. May 65, 45p
Rept. no. PT-900
Contract AF30 602 3508, Proj. 4506, Task 450602
RADC TR-65-75
Unclassified report

Descriptors: (*Crossed field devices, Time-delay relays), (*Time-delay relays, Feasibility studies), Microwave equipment, Coupling circuits, Delay circuits, Electrodes, Cyclotron waves.

A six month program of theoretical and experimental investigation to determine the feasibility of developing a crossed-field microwave tube to operate as a variable time delay device was carried out in the Crossed-Field Oscillator Group of the Raytheon Microwave and Power Tube Division. A broadband delay coupler was constructed and tested to determine the limits on bandwidth, insertion loss and signal power level. A large bandwidth fast cyclotron wave synchronous condition was obtained, but with a pronounced reduction in coupling because of the high interception current on the delay circuit. Low coupling made it impossible to obtain accurate data concerning beam saturation levels or insertion loss in the experimental coupler. A computer study of the beam optics in a variable drift space region determined the optimum design for the drift electrode shapes and potential profile for a delay variation of at least 150 nanoseconds. (Author)

AD-617 710 Div. 8/1
CFSTI Prices: HC$4.00 MF$0.75

Chu Associate, Littleton, Mass.
MULTIPLE PLATE ANTENNA ANALYSIS.
Final rept. for Jan 62-Aug 64,
by Robert L. Lagace. Aug 64, 102p
Contract AF19 628 297, Proj. 4600, Task 46007
AFCRL 65-171
Unclassified report

Descriptors: (*Antennas, Metal plates), (*Antenna configurations, Reflectors), (*Reflectors, Metal plates), Parabolic antennas, Bandwidth, Wave transmission Performance(Engineering), Rotation, Special purpose computers, Theory, Mathematical analysis, Design, Scanning, Antenna feeds.

Analyses are presented for elements of a multiple plate antenna system capable of providing very large antenna aperture operation in a more economical fashion than present conventional designs. This report presents details of space transmission analyses, design for multiple element systems, and design and performance of a feed system specifically designed for the multiple plate antenna. In order to increase system bandwidth, multiple plate antenna aperture subdivided into smaller multiple plate antenna elements coherently added together by means of a space transmission system was investigated. Theoretical analyses and experimental data are presented for the space transmission system. Theoretical analyses were confirmed by space transmission experiments resulting in transfer efficiencies in excess of 22%. A high performance feed was synthesized and designed for use with the multiple plate antenna at Strawberry Hill. The feed was developed to give an inverse taper aperture distribution in one plane and a cosine distribution in the orthogonal plane. Coverage from the feed system was designed to illuminate the multiple plate array in an optimum fashion. The synthesis procedure and details of design and performance of the feed system are described in the report.

AD-617 711 Div. 8/7, 6/6
CFSTI Prices: HC$6.00 MF$1.25

Mitre Corp., Bedford, Mass.
THE DESIGN OF RADAR SIGNALS,
by Evert N. Fowle. Jun 65, 201p Rept. no. SR-98
Contract AF19 628 2390, Proj. 750 0
ESD TR-65-97
Unclassified report

Descriptors: (*Detection, Radar signals), (*Radar signals, Design), (*Communication theory, Radar signals), Statistical functions, Target discrimination, Radar reflections, Configuration, Wave analyzers, Modulation, Harmonic analysis, Radar equipment.

This report discusses the design of radar signals. It is assumed that the radar receiver is matched to the signal so that the receiver output waveform, in the presence of signal Doppler frequency shift, is characterized by Woodward's two-dimensional signal correlation function. The signal correlation function is discussed, and certain of its properties are collected together. The problem of the detection of a target in the presence of many nearby targets is discussed, and an expression for the target capacity of a radar is developed in terms of the signal correlation function. There follows a discussion of the general problems of signal design for multiple target resolution and for detection of single targets in clutter. Signal waveforms are classified according to the type of modulation, and the design of waveforms of each type is considered in detail. The two-dimensional correlation function is given for each type of signal. Finally, the subject of techniques for generation and reception of signals is discussed. (Author)

AD-617 723 Div. 8/7, 15/1
CFSTI Prices: HC$5.00 MF$1.00

Operations Research Center, Mass. Inst. of Tech., Cambridge.
DYNAMIC BEHAVIOR AND CONTROL OF COMMUNICATIONS NETWORKS.
Technical rept.,
by John U. Beusch. Jun 65, 158p Rept. no. TR-13
Contract Nonr 184187, Proj. NR042 230
Unclassified report

Descriptors: (*Communication systems, Control), (*Operations research, Communication systems), Communication theory, Dynamic programming,

Queuing theory, Statistical processes, Mathematical models, Feedback, Data transmission systems.

An arbitrary store-and-forward network where messages without priorities can enter the network at any node and be destined for any other node is considered. The problem of routing messages is considered to be a feedback control problem in which information about the number of bits waiting at various places in the network is fed back to points where decisions are made. Mathematical models which represent system behavior are developed. The model of a single channel is a new Markov process queuing model with random arrivals and deterministic service times. Simple models which predict future queue lengths are developed. A way of reducing a set of series-parallel channels to a single equivalent channel is presented. A method of determining message routing decision rules which are based on what is known at a decision point is developed. A method of determining whether and how often to obtain information about another part of the network is developed. Many of the methods apply only to series-parallel networks. (Author)

AD-617 729 Div. 8/2, 25/6, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Sperry Microwave Electronics Co., Clearwater, Fla.
PRODUCTION ENGINEERING MEASURE YIG SPHERES AND LIMITERS.
Quarterly progress rept. no. 7, 29 Nov-28 Feb 65,
by J. E. Andrews, L. R. Hodges, Jr., and D. E. Tribby.
28 Feb 65, 14p Rept. no. SJ222-0045-7
Contract DA36 039AMC01477E
Unclassified report

See also AD-614 644.

Descriptors: (*Ferroelectric crystals, Manufacturing methods), (*Limiters, Manufacturing methods), (*Spheres, Single crystals), (*Single crystals, Crystal growth), Gallium compounds, Yttrium compounds, Iron compounds, Garnet, Heat treatment, L-band, Oxides, Temperature, Anisotropy, Reliability(Electronics).

Techniques making use of a heat treating process for adjusting the 4pi M sub s and linewidth values of GaYIG spheres have been tested and used to reduce the linewidth and control the 4pi M sub s where close tolerances are imposed. Further study of the frequency instability encountered upon subjecting the L band limiters to a varying temperature environment were found to be primarily due to the anisotropy field in the GaYIG material. Two batches of pure YIG and five batches of substituted YIG material were fired utilizing presintered garnet in place of the yttrium and iron oxides used prior to the previous reporting period. (Author)

AD-617 731 Div. 30/2, 8/2
CFSTI Prices: HC$6.00 MF$1.25

Ordnance Research Lab., Pennsylvania State Univ., University Park.
DESIGN AND ANALYSIS OF AN ULTRA-HIGH SPEED, TUNNEL DIODE, DIGITAL TO ANALOG CONVERTER (DECODER).
Technical memo.,
by J. A. Macaluso. 18 May 65, 241p
Rept. no. TM-615.3271-05
Contract NOw65 0123d
Unclassified report

Descriptors: (*Tunnel diodes, Digital-to-analog converters), (*Digital-to-analog converters, Tunnel diodes), Circuits, Computer logic, Superconductivity, Mathematical models, Programming(Computers), Wiring diagrams, Electrical engineering.

The capabilities and limitations of the tunnel diode as they apply to an ultra-high speed binary weighted ladder decoder were studied. A tunnel diode controlled gate was developed and the suitability of this circuit for implementing the binary sources of a current mode decoder was established. Equations describing decoder errors (both random and deterministic), static design procedures, and dyanmic operation were developed from theoretical considerations. A design example was included to demonstrate the evaluation of these equations for representative parameter values and to provide the basis for experimental verification of the theoretical procedure. Digital computer programs were developed to solve both the static and dynamic nonlinear equations of state. On the basis of the design example, it was shown that a decoder accuracy of better than one part in 1,000 and data rates up to 5 X 10 to the 8th power bits/sec (to five per cent accuracy) can be obtained with presently available components and relatively unsophisticated construction techniques. Finally, laboratory measurements were conducted on an experimental model of the decoder switch and, with the aid of the digital computer simulation program, satisfactory verification of the static and dynamic characteristics predicted in the theoretical study was obtained. (Author)

AD-617 736 Div. 8/2, 26/1
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., Philadelphia, Pa.
PRODUCTION ENGINEERING MEASURE TYPE 2N2762 SILICON ALLOY TRANSISTOR.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by T. E. Ebert, R. J. Pisarcik, and J. E. Priest.
31 Mar 65, 18p
Contract DA36 039AMC03617E
Unclassified report

See also AD-611 217.

Descriptors: (*Transistors, Manufacturing methods), Silicon, Reliability(Electronics), Processing, Encapsulation, Soldering, Diffusion.

All process improvements are reported as completed and incorporated in the manufacture of the contract device. Data are presented to demonstrate an increase of the energy level at which secondary breakdown occurs in the contract device when compared to devices fabricated using standard product techniques. A summary of progress and yield information is presented for the production run now in progress. Data for revised reliability test program are presented. (Author)

AD-617 738 Div. 8/2
CFSTI Prices: HC$3.00 MF$0.75

Electron Physics Lab., Univ. of Michigan, Ann Arbor.
RESEARCH ON CROSSED-FIELD ELECTRON DEVICES.
Interim scientific rept. no. 5, 15 Sep 64-15 Mar 65,
by T. A. DeMassa, S. G. Lele, N. A. Masnari, J. E. Rowe, and V. K. Tripathi. Apr 65, 84p
Rept. no. 05361-11-S
Contract DA36 039AMC00027E, Proj. 3A99 13 001 01
Unclassified report

See also AD-410 028.

Descriptors: (*Crossed field devices, Performance-(Engineering), (*Microwave amplifiers, Crossed field devices), (*Electron guns, Crossed field devices), (*Noise(Radio), Crossed field devices), Electron beams, S band, Monte Carlo method, Secondary emission, Motion, Numerical analysis, Partial differential equations, Experimental data.

Cw operation of the S-band amplifier using the extended

Kino gun has indicated essential agreement with theory and with earlier pulsed operation results. The crossed-field noise parameters have been evaluated for a modified version of the abbreviated Kino gun. These results are compared with those obtained previously for the original abbreviated gun. The results indicate that the noise parameters are affected by the laminarity of the electron beam. The experimental investigations of crossed-field electron beam characteristics have been continued in the beam analyzer. These investigations have been carried out for the abbreviated Kino gun at lower values of d-c voltage and magnetic field. A modified aperture system has been designed for the evaluation of the electron beam characteristics at the exit plane of the gun. The preliminary results of the aperture investigations have been analyzed and future modifications are discussed. A closed-form solution for the emitting-sole device has been obtained using a hard-kernel-bunch approximation and assuming small D. A slot-coupled vane structure has been designed for use as the slow-wave circuit in the emitting-sole device. (Author)

AD-617 749 Div. 8/2, 25/6, 25/1
CFSTI Prices: HC$3.00 MF$0.75

Motorola, Inc., Phoenix, Ariz. Semiconductor Products Div.
ACTIVE ACOUSTIC DEVICES.
Interim quarterly rept. no. 2, 1 Oct-31 Dec 64,
by N. G. Sakiotis, W. H. Brendecke, and F. S. Hickernell.
May 65, 63p
Contract AF30 602 3478, Proj. 5578, Task 557802
RADC TR-65-89
Unclassified report

See also AD-612 703.

Descriptors: (*Transducers, Semiconductor devices), (*Acoustic equipment, Semiconductor devices), (*Semiconductor devices, Transducers), Phonons, Solid state physics, Ultrasonic properties, Piezoelectric crystals, Epitaxial growth, Cadmium compounds, Sulfides, Films, Vapor plating, Vacuum apparatus, Zinc compounds, Oxides.

Investigations of suitable heat sink material needed for CW operation resulted in the development of a BeO-loaded epoxy with a thermal conductivity of 1.6 BTU/Hr-Ft-degrees F. This appears compatible with the requirements as previously determined. The open-tube or dynamic technique was determined to be the most feasible for the epitaxial growth of CdS transducers. Theoretical and experimental investigations of the vacuum deposition of CdS resulted in films with resistivity values ranging from 300 ohm-cm to 7 X 10 to the 6th power ohm-cm. Good quality CdS crystals with high mobility and intermediate resistivity levels were obtained by annealing in a sulphur atmosphere. Investigation of the properties of zinc oxide crystals were initiated. (Author)

AD-617 771 Div. 30/2
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
INTEGRATING COMPUTERS INTO BEHAVIORAL SCIENCE RESEARCH,
by H. Borko. 3 Jun 65, 29p Rept. no. SP-2102
Unclassified report

Prepared for presentation at the Annual Institute in Technical and Industrial Communications (8th) Colorado State Univ., 6-10 Jul 65.

Descriptors: (*Behavior, Simulation), (*Computers, Psychology), Data processing systems, Statistical analysis, Education, Learning, Language, Social communication, Machine translation, Information retrieval, Classification.

For the behavioral scientist, the computer provides a means of performing complex statistical analyses and a method of simulating systems of interacting variables. Data processing techniques have been applied to educational studies, information handling and communication problems. The computer has served not only as a powerful investigatory tool but also as an instigator of more significant problems. In both of these roles computers have been having a profound effect on behavioral science research. (Author)

AD-617 772 Div. 30/2
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
APPLICATION OF EMPIRICAL METHODS TO COMPUTER-BASED SYSTEM DESIGN,
by Gloria Lauer Grace. 1 Jun 65, 36p
Rept. no. SP-1952
Unclassified report

Prepared for presentation at the Annual Meeting of the Western Psychological Association (45th), Honolulu, Hawaii, 14-19 Jun 65.

Descriptors: (*Computers, Systems engineering), (*Systems engineering, Design), Data processing systems, Feasibility studies, Reading.

Information was provided about the clarity and usefulness of different printout formats. Three forms of actual printouts each describing 20 profile flights were prepared. These printouts contained exactly the same information and were designated: (1) Verbal. Information was presented using words, phrases or sentences, (2) Data Block. Information was presented in blocks of data. Position and alphabetic code indicated meaning, (3) Eidoform. Information was presented on computer-produced, map-like printouts. Analysis of variance shows experimental treatment conditions to be significantly different. When variance due to practice has been extracted, differences in printout effectiveness are statistically significant. On the first trial, Data Block printouts were about equally effective, while Eidoform printouts tend to be less effective and harder to understand. Interview data support this finding. Differences due to order of presentation, test forms and practice are not significant. The feasibility of applying empirical methods to computer printout design has been demonstrated by this study. Actual performance scores and preferences of military users yield valuable information which can be applied to the design of future printouts. (Author)

AD-617 776 Div. 8/7, 25/1
CFSTI Prices: HC$2.00 MF$0.50

Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
TRANSINFORMATION OF A BINARY UNDERWATER ACOUSTIC COMMUNICATION CHANNEL REFLECTED FROM A RANDOM SURFACE.
Technical rept.,
by Arvind M. Bhopale and Robert F. Hill. 1 May 65, 38p Rept. no. TR-9
Contract Nonr39612, Projs. NR185 700, RR001 03 05
Unclassified report

Descriptors: (*Acoustics, Underwater communication systems), (*Underwater communication systems, Sound transmission), (*Sound signals, Communication

theory), (*Communication theory, Underwater sound signals), Underwater sound, Amplitude modulation, Reflection, Surface area, Acoustic equipment, Model basins.

This report is concerned with an investigation of information capability of a binary coded, amplitude modulated, narrow-beam acoustic signal reflected from a wind driven surface. Experimental work is conducted in a model tank. The transinformation is measured as a function of modulation index for an input consisting of a random, non-return-to-zero binary pulse train using a simple synchronous detector at the output. Various systems are utilized to generate, reconstruct, and process the signal. The results show that the transinformation is related to the modulation index and the sea state. Also, it is demonstrated that the use of more sophisticated detectors can increase the transinformation under certain circumstances. (Author)

AD-617 777 Div. 8/7, 25/1, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
THE STATISTICAL PROPERTIES OF THE SLOPE OF A WIND DRIVEN WATER SURFACE OF A MODEL TANK.
Technical rept.,
by Jan Willems and Robert F. Hill. 15 May 65, 69p
Rept. no. TR-10
Contract Nonr39612, Projs. NR185 700, RR001 03 05
Unclassified report

See also AD-617 776.

Descriptors: (*Water waves, Sound transmission), (*Underwater communication systems, Sound transmission), (*Sound transmission, Water waves), (*Communication theory, Underwater sound signals), Acoustics, Sound signals, Reflection, Water, Surface properties, Statistical analysis, Fluid mechanics, Model basins.

The communication characteristics of underwater acoustic signals are being studied in a model tank. Part of this study concerns signals which are reflected from the water surface. To obtain the characteristics of these signals, the statistical description of this random moving surface is very important. The most important factors determining the state of this surface are the waveheight and the surface slope. The waveheight statistics have been studied before and this study is concerned with the slope statistics of the water surface. The slope statistics are obtained with a device which utilizes a lightbeam refracted at the surface and a photocell. From an analysis of the output voltage of this photocell, the statistics of the components of the slop of the surface are derived. The probability density function of the crosswind slope compares well with a Gaussian, but the probability density function of the down-wind slope is skewed towards the slopes in the tails of the waves. The variation of the variances of the cross-wind slope and of the down-wind slope with windspeed is then investigated. The sum of the variances of the cross-wind slope and the down-wind slope increases linearly with windspeed and their ratio is constant. (Author)

AD-617 779 Div. 8/2, 14/2
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., Schenectady, N. Y.
Power Tube Dept.
INVESTIGATION OF VARIOUS ACTIVATOR REFRACTORY SUBSTRATE COMBINATIONS.
Final rept. for Feb 64-Feb 65,
by John H. Affleck and William T. Boyd.
Jun 65, 62p
Contract AF30 602 3395, Proj. 5573, Task 557303
RADC TR-65-100
Unclassified report

Descriptors: (*Refractory materials, Cathodes-(Electron tubes)), (*Cathodes(Electron tubes), Thermionic emission), (*Barium compounds, Cathodes(Electron tubes)), Work functions, Contamination, Evaporation, Tantatum compounds, Yttrium compounds, Zirconium compounds, Oxides, Gases, Diodes(Electron tubes), Titanium compounds, Silicon compounds, Processing.

An investigation was conducted to examine the properties of various materials suitable for dispenser cathode systems. Work function, evaporation rate, and poisoning effects have been measured in an effort to characterize these systems. It has been shown that various barium dispenser cathode systems may have effective work functions at 1250 K in the range of 2.40 to 1.80 ev and that excess barium oxide in the matrix gives emission characteristics similar to the oxide cathode. Low mass gases such as oxygen, carbon monoxide and carbon dioxide have deleterious effects on the barium dispenser systems while the effects of hydrogen and methane seem to depend strongly on the nature of the emitting surfaces as well as other parameters encountered in the normal testing procedure. A diode test in a commercial type of tube demonstrated the feasibility of a simplified fabrication procedure for producing a low work function emitter, phi = 1.80 ev at 1250 K. (Author)

AD-617 787 Div. 8/2
CFSTI Prices: HC$3.00 MF$0.75

Pioneer Central Div., Bendix Corp., Davenport, Iowa.
DESIGN AND DEVELOPMENT OF FREQUENCY TEMPERATURE COMPENSATED QUARTZ CRYSTAL OSCILLATORS, PHASE I.
Interim rept. for 1 Apr-31 Dec 64,
by Richard H. Bangert and Donald L. Thoman. 9 Apr 65, 96p Pub. no. 3115A-65
Contract DA28 043AMC00042E, Proj. 1P6 220001A058
Task 1P6 22001A058 02, 1P6 22001A058 02 13
Unclassified report

Descriptors: (*Crystal oscillators, Quartz), High frequency, Aging(Materials), Voltage regulators, Circuits, Thermistors, Temperature, Diodes(Semiconductor), Stability, Reliability(Electronics).

The need for ovenless quartz crystal oscillators having a deviation less than ± 0.75 parts per million from an absolute frequency over all service conditions, including crystal aging, has become evident for modern communications systems. Current knowledge derived from studies on frequency temperature compensation techniques indicate the feasibility of combating the difficulties associated with frequency compensated oscillators to produce a reduction in both power and size over conventional oscillator-oven assemblies. The object of Phase I of this program is to design and fabricate seven exploratory development oscillator models operating at 3 mc and employing such compensation techniques to achieve a stability requirement of less than ± 0.5 ppm over the temperature range of -40C to +65C. After evaluation of these exploratory models, eighteen advanced models incorporating the revisions required will be fabricated under Phase II of this program. This report covers only the effort expended in Phase I of this program. The significant problem areas were related to (1) development of a voltage regulator with good regulation throughout the temperature range, (2) evolution of a standard compensation network, (3) limitations in the state-of-the-art of crystal technology, (4) low power input requirement of 65 milliwatts, and (5) development of a constant gain amplifier using high tolerance components. (Author)

AD-617 800 Div. 30/2

Ohio State Univ. Research Foundation, Columbus.
A GENERALIZATION OF NELSON'S ALGORITHM FOR OBTAINING PRIME IMPLICANTS,
by R. W. House and T. Rado. 8 Jan 64, 6p
Grant DA AROD31 124G312
AROD 1685:23

Unclassified report

Pub. in The Journal. of Symbolic Logic v30 n1 p8-12 Mar 1965
(Copies available only to DDC users).

Descriptors: (*Computer logic, Special functions-(Mathematical)), (*Special functions(Mathematical), Computer logic), Programming(Computers), Mathematical logic, Prime numbers, Combinatorial analysis.

AD-617 825 Div. 8/2, 15/1

Syracuse Univ., N. Y. Dept. of Mathematics.
DETERMINING INPUT-OUTPUT RELATIONSHIPS OF NONLINEAR SYSTEMS BY INVERSIONS.
Revised ed.,
by P. Frank and R. McFee. 21 Nov 62, 13p

Unclassified report

Pub. in IEEE Transactions of the Professional Technical Group on Circuit Theory vCT10 n2 p168-80 Jun 1963 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 28 Jun 62.

Descriptors: (*Circuits, Nonlinear systems), (*Numerical analysis, Circuits), Graphics, Iterative methods, Feedback amplifiers, Tunnel diodes, Input-output devices, Integrals, Polynomials, Taylor's series.

The relation between input and output of many linear systems and circuits is ordinarily found by repeated use of functional inversion, i.e., the process where, given $y = Zx$ one finds $x = (1/Z)y$. Many nonlinear circuits and systems can be analyzed using functional inversion in exactly the same way. The methods for accomplishing this inversion however are different. Where the nonlinear relations are given as graphs, the inverse relations are shown by the same graphs. Where derivatives and integrals are involved, approximate inverses can be obtained using a generalization of the 'reversion' method of Sims and Pipes, or the iteration method. Practical examples given include the design of a nonlinear equalizer and the analysis of a feedback circuit, a tunnel diode network, and an automatic gain control circuit. The mathematical bases of the methods are discussed, along with their representation by flow graphs, and the insertion of initial conditions. (Author)

AD-617 859 Div. 8/3, 8/2, 15/1

Carnegie Inst. of Tech., Pittsburgh, Pa.
TOPOLOGY OF SERIES-PARALLEL NETWORKS,
by R. J. Duffin. 1964, 16p
Grant DA ARO D31 124G78
AROD 223:63

Unclassified report

Pub. in Journal of Mathematical Analysis and Application v10 n2 p303-18 Apr 1965 (Copies available only to DDC users).

Descriptors: (*Topology, Electrical networks), (*Electrical networks, Topology), Graphics, Synthesis, Electric bridges.

AD-617 877 Div. 30/2

Electronics Research Lab., Univ. of California, Berkeley.
A CENSUS OF FINITE AUTOMATA,
by Michael A. Harrison. 12 Aug 63, 15p
Grant AF AFOSR139 63
AFOSR 65-0902

Unclassified report

Pub. in The Canadian Journal of Mathematics v17 p100-3 1965
(Copies available only to DDC users).

Descriptors: (*Automata, Theory), Functions, Combinatorial analysis, Input-output devices, Digital computers.

AD-617 888 Div. 8/2, 15/1
CFSTI Prices: HC$5.00 MF$1.25

New York Univ., N. Y. School of Engineering and Science.
NETWORK PROPERTIES OF DISTRIBUTED RC NETWORKS WITH ARBITRARY GEOMETRIC SHAPES.
Scientific rept.,
by John J. Kelly and Mohammed S. Ghausi. Mar 65, 185p Rept. nos. TR-400-107, SR-15
Contract AF19 628 379, Proj. 5628, Task 562806
AFCRL 65-312

Unclassified report

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Descriptors: (*Electrical networks, Electrical properties), Resistors, Capacitors, Geometry, Transients, Differential equations, Series, Electrical impedance, Admittance, Taper, Frequency, Dielectrics.

A systematic study is presented of the network properties of distributed RC networks having one dimensional spatial variation and arbitrary geometric shapes. With emphasis on the analysis, analytic and approximation techniques are considered which can be used to obtain the two-port immittance parameters of the distributed RC networks. Various methods are introduced for finding the pole-zero patterns of the immittance parameters. Approximation techniques are also included to find the effective dominant zero and the excess phase, within a specified error, of network functions having an infinite number of roots on the negative real axis. It is further shown how such approximations can be utilized to obtain simply the key features of the steady state and the transient response of distributed RC networks. Examples of the various methods are given so as to make the techniques more palatable for circuit engineers. Extensive numerical tables are also presented to show the effectiveness of the various methods as well as to develop appreciation for the understanding and handling of distributed RC networks. (Author)

AD-617 893 Div. 8/2, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Fairchild Semiconductor Div., Fairchild Camera and Instrument Corp., Mountain View, Calif.
PRODUCTION ENGINEERING MEASURE FOR IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR PNP INTERMEDIATE POWER SILICON PLANAR SWITCHING TRANSISTORS INCLUDING 2N3502.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 65,

by R. C. Dorilag and J. C. Diepeveen. 31 Mar 65, 30p
Contract DA36 039AMC06155E

Unclassified report

Descriptors: (*Transistors, Manufacturing methods), Reliability(Electronics), Silicon, Processing, Coatings, Conveyors, Jigs, Impurities, Disks, Performance-(Engineering).

Thorough evaluation of the test results, accumulated during the operation of the test-masking line built by Fairchild, proved the feasibility of the mechanized semiautomatic masking process. However, a modification of the mechanical concept was necessary for the post exposure part. Through a long term systematically determined evaluation program, it was found that improvements had to be made in certain areas of the Optical Alignment Jig. The areas were in the Microscope Assembly, Light Source Assembly and Chuck and Positioner Assembly. A preliminary survey of the 2N3502 devices was made. The survey indicated that Beta variation is most pronounced in the vertical direction of a wafer; it is maximum on top of the wafer and minimum at the bottom. This directional, rather than random variation of Beta, indicated several possible causes, some of which have been investigated. (Author)

AD-617 910 Div. 8/4
CFSTI Prices: HC$2.00 MF$0.50

Watkins-Johnson Co., Palo Alto, Calif.
STUDY OF DISTORTION IN KLYSTRONS AND TRAVELING-WAVE TUBES,
Quarterly progress rept. no. 7, 1 Dec 64-28 Feb 65, by William Kunz. 28 Feb 65, 32p
Rept. no. W-J 65-619R7
Contract DA36 039AMC02321E, Proj. 1P6 22001A 055
Task 1P6 22001A055 04

Unclassified report

See also AD-456 544.

Descriptors: (*Klystrons, Distortion), (*Traveling-wave tubes, Distortion), Phase distortion, Design, L-band, Voltage, Helixes, Power, Gain, Microwave amplifiers, Electron beams, Focusing, Modulation.

The work accomplished on the study of distortion in klystrons and traveling-wave tubes is described. Experimental results are given for various versions of the test vehicle, the WJ-237, a PPM focused 2.5 watt L-band traveling-wave tube. Experimental results include the two-tone phase characteristics and the two-tone balanced intermodulation characteristics as a function of frequency and helix voltage. The program plan for the last quarter is listed. (Author)

10. Energy Conversion (Non-propulsive)

AD-617 275 Div. 7/1, 22/1
CFSTI Prices: HC$2.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
ELECTRONIC TIME-FUZE POWER SUPPLIES FOR ARTILLERY SHELLS,
by Benjamin L. Davis and Glenn L. Scillian.
14 May 65, 29p Rept. no. TR-1288
Projs. DA1X542709D369; 45894
Unclassified report

Descriptors: (*Power supplies, Batteries + components), (*Batteries + components, Time-delay fuzes), (*Time-delay fuzes, Power supplies), Projectiles, Storage batteries, Primary cells, Thermal batteries, Life expectancy, Storage, Military requirements, Feasibility studies, Dry cells, Electrolytes, Effectiveness, Ammonia, Metals.

A study was made of the electrochemical systems suitable for providing power to artillery-shell time fuzes. The evaluation was based upon the energy density, operability over the required military temperature range, and storability. The major problems to be solved include operation over the temperature range of -65 to + 165F, a shelf life of at least 10 yr, fast activation, and small size. A program is recommended that should lead to the successful development of one or more power-supply designs for this application. (Author)

AD-617 333 Div. 7/1
CFSTI Prices: HC$2.00 MF$0.50

Naval Research Lab., Washington, D. C.
THEORETICAL DESIGN OF PRIMARY AND SECONDARY CELLS. PART IV. FURTHER STUDIES OF THE BATTERY DISCHARGE EQUATION.
Interim rept.,
by C. M. Shepherd. 16 Nov 64, 29p
NRL Rept. no. 6129
Projs. SF013 06 03 4366, RR001 01 43 4755
Unclassified report

See also PB-151 057.

Descriptors: (*Electric discharges, Batteries + components), (*Primary cells, Design), (*Storage batteries, Design), Voltage, Polarization, Resistance-(Electrical), Numerical analysis, Theory, Electrochemistry, Equations, Experimental data.

An equation was derived describing a complete battery discharge for the case where the current density is constant. The battery potential during discharge is given as a function of time, current density, polarization, internal resistance, and other factors. This equation has a number of practical applications. It can be used to describe battery charges, discharges, capacities, power evolution, and to predict capacities and locate errors in experimental data. A simplified numerical system was developed for determining the equation constants from the experimental data. (Author)

AD-617 348 Div. 7/6, 25/3, 14/2, 17/4
CFSTI Prices: HC$6.00 MF$1.25

General Electric Co., Schenectady, N. Y.
VAPOR FILLED THERMIONIC CONVERTER MATERIALS AND JOINING PROBLEMS. PLASMA RESEARCH PERTINENT TO THERMIONIC CONVERTER OPERATION.
Final technical summary rept. for 15 Nov 61-15 Dec 62,
by M. J. Slivka, R. H. Bristow, and M. D. Gibbons.
15 Dec 62, 218p Rept. no. R-572F
Contract NObs86220, Proj. SR007 1201;
ARPA Order 219 61
Unclassified report

Descriptors: (*Thermionic converters), (*Plasma physics, Thermionic converters), (*Cesium, Vapors), (*Joining, Thermionic converters), Aluminum compounds, Oxides, Corrosion, Titanium alloys, Zirconium alloys, Nickel alloys, Ceramic materials, Seals-(Stoppers), Electric discharges, Emissivity, Electrodes, Tantalum, Tungsten, Plasma medium, Energy conversion.

Contents: Vapor filled thermionic converter materials and joining problems (cesium attack, metal-ceramic seals); Plasma research pertinent to thermionic converter operation (experimental studies of the emission and discharge characteristics of the Ta-Cs system); Vapor filled thermionic converter materials and joining problems (cesium attack, metal-ceramic seals); Plasma research pertinent to thermionic converter operation (experimental studies of the emission and discharge characteristics of the Ta-Cs system).

AD-617 351 Div. 7/1
CFSTI Prices: HC$4.00 MF$1.00

Eagle-Picher Co., Joplin, Mo. Couples Dept.
LOW TEMPERATURE TESTING OF BATTERY BA-494( )/U.
Final rept. for Jan-Apr 65,
by R. E. Barnett. Apr 65, 127p
Contract DA28 043AMC01222E, Proj. 5242 32 196,
Tasks 5242 32 196 00, 5242 32 196 02
Unclassified report

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Descriptors: (*Guided missile batteries, Low-temperature research), (*Low-temperature batteries, Tests), Batteries + components, Electric discharges, Voltage, Reliability, Seals(Stoppers), Electrolytes.

The report presents data obtained in testing the BA-494( )/U at temperatures from 95F down to 70F in 5F increments. In addition to the temperature study, the rates of discharge were varied from the original specifications as well as modifications in instrumentation. Information of considerable value and interest was gained through this test program. Some difficulties were encountered which will prove to be advantageous in that recommended corrective actions may be taken or alternates considered. (Author)

AD-617 406 Div. 7/1
CFSTI Prices: HC$1.00 MF$0.50

Eagle-Picher Co., Joplin, Mo.
ADVANCED DEVELOPMENT MODELS OF VENTED NICKEL-CADMIUM BATTERIES.
Final rept. for 5 Apr 64-15 Mar 65,
by Jeff K. Wilson. 15 Mar 65, 20p
Contract DA28 043AMC00065E, Proj. 1C6 22001A053,
Task 1C6 22001A05302
Unclassified report

Descriptors: (*Alkaline cells, Design), (*Storage

batteries, Design), Nickel, Cadmium, Physical properties, Battery separators, Specifications, Production, Tests.

Development and production work was directed toward the production of forty (40) each BB-435/U, BB-437/U, BB-438/U and BB-439/U vented nickel-cadmium batteries. The work was directed toward the attainment of a new line of nickel-cadmium batteries in accordance with the Signal Corps Technical Requirements SCL-6867B. (Author)

AD-617 603 Div. 7/6, 7/5
CFSTI Prices: HC$2.00 MF$0.50

Radio Corp. of America, Harrison, N. J. Electronic Components and Devices.
100 WATT THERMOELECTRIC GENERATOR.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 65,
by H. P. Van Heyst and O. H. Schade, Jr.
30 Apr 65, 49p
Contract DA28 043AMC00265E, Proj. 1E6 41209D535,
Task 1E6 41209D535 12

Unclassified report

Descriptors: (*Thermoelectricity, Generators), (*Generators, Thermoelectricity), Thermocouples, Heaters, Heat transfer, Energy conversion, Gasoline, Voltage regulators, Heat exchanges, Design, Life expectancy, Starting, Performance(Engineering).

A number of modifications were made on the thermoelectric couple design. These modifications were prompted by the module power output performance obtained during the last quarter. A number of modules incorporating the previous design were operated for extended periods under open circuit and matched load conditions, design operating temperatures and overshoot temperatures. The performance of these modules was reliable at the required operating conditions. The burner radiant construction has been established and has been found to be a good compromise between heat transferring ability, desired flux distribution and service life. No major difficulties were encountered when the exhaust duct, vaporizer heat-exchanger, gasoline burner and thermoelectric converter were operational tested. These limited operational tests have shown that the burner combusts leaded gasoline in accordance with all design requirements. In the area of auxiliary component and control devices, the shunt voltage regulator is essentially the same as that described last month except that the base connection of the gate transistor is brought to a rotary switch at the generator instrument panel where one of four regulated outputs may be selected. The starting burner was designed around a NGTE air blast atomizer. Initial tests on this burner indicate that it heats the vaporizer heat exchanger with little or no difficulty. (Author)

AD-617 645 Div. 7/6, 7/5, 4/4

Defence Research Chemical Labs., Ottawa (Ontario).
AN EXPERIMENTAL APPROACH TO THE REVERSIBLE OXYGEN ELECTRODE,
by E. E. Criddle. 24 Dec 63, 17p
Rept. no. DRCL-429

Unclassified report

Pub. in Electrochimica Acta v9 n7 p853-68 1964
(Copies available only to DDC users).

Descriptors: (*Fuel cells, Cathodes), (*Cathodes, Fuel cells), (*Oxygen, Electrodes), Polarization, Anodes, Electric currents, Voltage, Impurities, pH, Pressure, Platinum, Sorption, Peroxides, Canada.

Oxygen electrodes on platinum in 1 M KOH are described which exhibit rest potentials from 0.9 to 1.59 ± 0.01 V, vs H2 (1 atm) in the same solution. The electrodes will operate reversibly about these rest potentials with respect to small anodic and cathodic loads. The current/potential (I/E) plots at higher loads are similar in slope and position for electrodes of both low and high rest potential. The effects of impurities, pH, and pressure on these potentials and I/E curves are investigated experimentally. The self-sustaining nature of these potentials is demonstrated by potential/time recovery curves on a 1.45 V electrode. The sorption of oxygen on platinum and the nature of the peroxide electrode are reviewed briefly to clarify the results obtained on the high potential electrodes. (Author)

AD-617 714 Div. 7/1, 4/4
CFSTI Prices: HC$2.00 MF$0.50

Rocketdyne, Canoga Park, Calif.
HIGH-ENERGY BATTERY SYSTEM STUDY.
Quarterly progress rept. no. 7, 1 Jan-31 Mar 65,
by J. Farrar, R. Keller, and M. M. Nicholson.
31 Mar 65, 28p Rept. no. R-5405-7
Contract DA36 039AMC03201E, Proj. 1C6 22001A053
Task 1C6 22001A053 02

Unclassified report

Descriptors: (*Primary cells, Electrochemistry), (*Cathodes(Electrolytic cells), Materials), (*Electrolytes, Organic materials), Batteries + components, Bromine, Bromine compounds, Iodine compounds, Oxides, Cyanides, Chromium compounds, Copper compounds, Calcium compounds, Sulfides, Iron compounds, Cesium compounds, Silver compounds, Manganese compounds, Fluorine compounds, Organic sulfur compounds, Sulfoxides.

A group of new cathode materials was tested in half-cell studies, including Br2, I2O5, BrCN, CrO3, CuS, FeS2, Ca(OCl)2, CsSF5, and others. AgO, MnO2, and CuF2 were investigated further. Discharge curves were generally better in dimethyl sulfoxide than in propylene carbonate. Higher utilization efficiencies were achieved at low-current densities. A lithium/water system was tested and a cell voltage of 2 volts was obtained over a period of 5 hours at a moderate discharge current density. (Author)

AD-617 725 Div. 7/6, 7/5
CFSTI Prices: HC$3.00 MF$0.75

Carnegie Inst. of Tech., Pittsburgh, Pa.
UNCONVENTIONAL METHODS FOR INFLUENCING FLUID FLOW PART II. ELECTROKINETIC PUMPING.
Final technical rept., pt. 2,
by George A. McLennan. May 65, 76p
Contract AF33 657 9914, Proj. 8169, Task 816904
APL TR-64-133 P2

Unclassified report

Descriptors: (*Electromechanical converters, Pumps), (*Pumps, Electromechanical converters), (*Fluid flow, Energy conversion), Electric power production, Electric currents, Capillary tubes.

An analysis of electrokinetic energy convertors is presented. This analysis was executed in such a way as to permit comparisons to be made between devices employing different working fluids in which the charging mechanism may be different. Using experimental data from the literature, the conversion capability is predicted for water, various organic liquids, and liquid mercury. The general conclusion is that the efficiency of such devices does not ever appear to be very large. A series of experiments carried out on an electrokinetic pump using water as the working fluid are described in detail. The intention here is not only to indicate how well practice matches theory

but to point out the numerous practical problems associated with the serious use of such devices as fluid pumps. The general conclusion is that uncertainties in the electrical properties of fluids cannot reasonably be avoided and act so as to make the prediction of the actual behavior of these devices very difficult. (Author)

AD-617 832 Div. 7/1, 4/4

Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
SOME NEW ELECTROCHEMICAL DEVICES,
by I. H. S. Henderson, E. J. Casey, and E. E. Criddle.
1962, 15p Rept. no. DRCL-369

Unclassified report

Pub. in Batteries p207-20 1963 (Copies available only to DDC users).

Prepared for presentation at the International Battery Symposium, Oct 62, Bournemouth, England.

Descriptors: (*Fuel cells, Instrumentation), (*Batteries + components, Meters), (*Pressure gages, Fuel cells), (*Dosimeters, Fuel cells), Electrochemistry, Alkaline cells, Canada, Electrolytes, Storage batteries, Radiation chemistry.

In addition to providing a better understanding, which eventually leads to better control of battery production, electrochemical research can lead to new devices-new products which aid diversification in the industry and help support and stimulate further research. Description of some new devices which have arisen from our program of battery research is presented. These include a coulometer for control of battery charging, a radiation dosimeter and a very sensitive gas pressure regulator for fuel cells. Other electrochemical effects which could be developed into usable controls are discussed. (Author)

11. Materials

AD-617 244 Div. 14/7, 14/8
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
DEGRADATION OF ORGANIC COATINGS BY IRRADIATION WITH LIGHT. III. VOLATILE PRODUCTS FROM SIMULATED SOLAR IRRADIATION IN AIR.
Technical note,
by Peter J. Hearst. 10 Jun 65, 42p
Rept. no. TN-N-729
Proj. Y R011 01 01 021

Unclassified report

Descriptors: (*Organic coatings, Degradation), (*Plastic coatings, Degradation), (*Solar radiation, Radiation damage), Films, Polyester plastics, Oils, Vinyl plastics, Epoxy plastics, Polyamide plastics, Vapors, Spectra(Infrared), Gas discharges, Xenon, Mercury, Ultraviolet radiation.

Various clear vehicle films were irradiated in air with a xenon arc and the volatile products were identified by infrared spectroscopy. The films included alkyd, oil, vinyl-alkyd, vinyl, vinyl acetate, epoxy-amine, and epoxy-polyamide films. The volatile products obtained were qualitatively similar to those obtained by mercury arc irradiation of the same films, but the relative amounts of the various products were changed in many cases. The products from the mercury arc irradiation contained acetylene but those from the xenon arc irradiation did not contain acetylene. These differences in the products show that the more rapid deterioration in the ultraviolet light from the mercury arc differs from the deterioration obtained in the simulated sunlight from the xenon arc. (Author)

AD-617 253 Div. 14/7, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
COMPARISON OF SOME PHYSICAL AND CHEMICAL PROPERTIES OF VACUUM EVAPORATED AND SPUTTERED NICKEL-CHROMIUM FILMS.
Technical rept.,
by Isaac H. Pratt, William Weintraub, and William L. Wade. Apr 65, 29p
Rept. no. ECOM-2582
Task 1C0 24401A112 04

Unclassified report

Descriptors: (*Metal films, Processing), (*Nickel alloys, Metal films), (*Chromium alloys, Metal films), (*Sputtering, Metal films), (*Vapor plating, Metal films), Vacuum apparatus, Chemical properties, Physical properties, Density, Thickness, Resistance(Electrical), Aging(Materials), Cleaning, Metal coatings, Chemical analysis, Interferometers.

Thin films of nickel-chromium were deposited on planar glass substrates by vacuum evaporation and sputtering processes. The alloy 'Nichrome V' with a bulk composition Ni 80% Cr 20% was evaporated from a tungsten filament and used as the cathode in the sputtering process. The composition ratio, sheet resistivity, thickness, film density and temperature coefficient of resistance were investigated or derived for each process and compared. Under constant deposition conditions the vacuum evaporated films indicate a variation of composition ratio with sheet resistivity whereas for sputtered films the ratio tends to remain nearly constant over an extended range of sheet resistivities. The temperature coefficient of resistance varies with the sheet resistivity from positive to negative for the evaporated films whereas for the sputtered films the coefficient remains positive over an extended range of sheet resistivities. (Author)

AD-617 259 Div. 17/2, 31/3
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
CATHODIC PROTECTION OF MOORING BUOYS AND CHAIN. PART I. INITIAL FIELD TESTING.
Technical note for May 64-May 65,
by Richard W. Drisko. 7 Jun 65, 27p
Rept. no. TN-728
Proj. Y R007 08 04 404

Unclassified report

Descriptors: (*Buoys, Cathodic protection), (*Chains, Cathodic protection), (*Cathodic protection, Buoys), Zinc, Anodes, Marine engineering, Environmental tests.

A study was conducted into the feasibility of cathodically protecting a fleet mooring. The original cathodic protection system utilized sacrificial magnesium anodes with automatic control heads designed to maintain the desired potential level. This system did not operate satisfactorily. A modification using uncontolled zinc anodes gave a higher level of protection to the buoy and riser chain but insufficient zinc was present on the ground legs to provide the necessary potential. (Author)

AD-617 271 Div. 14/2
CFSTI Prices: HC$1.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
DETERMINING THE THERMAL CONTACT RESISTANCE BETWEEN METAL-CERAMIC SURFACES,
by V. S. Miller. Apr 65, 11p RSIC-401
TT 65-62549

Unclassified report

Trans. of Akademiya Nauk URSR, Kiev. Instytut Teploenergetyky. Zbirnyk Prats n20 p54-9 1960.

Descriptors: (*Cermets, Thermal conductivity), USSR, Surface properties, Carbides, Silicon compounds, Powder metallurgy, Alloys, Hardness.

AD-617 320 Div. 17/5, 17/2
CFSTI Prices: HC$1.25 MF$0.50

Watervliet Arsenal, N. Y.
THE EFFECT OF MICROSTRUCTURE AND AGING CONDITION ON THE FATIGUE CHARACTERISTICS OF THE 18% Ni MARAGING STEELS.
Technical rept.,
by J. M. Barranco, R. V. Milligan, and T. E. Davidson. May 65, 41p Rept. no. WVT-6502
Proj. 1CO 24401A110

Unclassified report

Descriptors: (*Maraging steels, Fatigue(Mechanics)), Microstructure, Aging(Materials), Nickel alloys, Chromium alloys, Molybdenum alloys, Ductility, Toughness, Heat treatment, Vanadium alloys.

Smooth and notched rotating beam fatigue characteristics at various strength levels are presented over the range of 1000-100000 cycles-to-failure for 250 and 300 grade 18% Ni maraging steels and a modified 4330 alloy.

Two different heats of each of the maraging steels having large differences in ductility and toughness due to microsegregation are examined. In addition, the effects of under- and over-aging on fatigue properties are also studied. The microstructural segregation in the maraging steel showed no detrimental effect on the smooth or notched fatigue properties even though the ductility and toughness values were greatly reduced. Underaging the maraging steels was found to drastically impair the notched fatigue behavior. No correlation was found between notched fatigue behavior, as expressed by notched strength reduction factor, and the standard engineering mechanical properties of ductility and toughness. (Author)

AD-617 332 Div. 17/5, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
OBSERVATIONS MADE AT THE ROOT OF A NOTCH IN IRON FATIGUED IN BENDING,
by D. A. Meyn, C. D. Beachem, and T. C. Lupton.
May 65, 23p. NRL Memo. rept. 1614
Proj. WW041 R05 24G

Unclassified report

Descriptors: (*Iron, Fatigue(Mechanics)), Wire, Fracture(Mechanics), Plastic flow, Microstructure, Deformation.

A piece of Armco iron wire was notched to a depth of .030 in., polished and etched, and then cycled by reversed plane bending. Plastic replicas were made of the notch root after the completion of each tensile stroke. A long trough or crack, about 20 microns deep and 20 microns wide was observed to develop during 7-1/4 cycles. Various effects of cyclic plastic flow were observed in detail at and near the notch root, including the formation of slip bands and subsequent fissuring in the slip bands, and the sinking of surface material to form troughs during cycling. (Author)

AD-617 399 Div. 17/4, 17/2
CFSTI Prices: HC$3.00 MF$0.75

Boeing Scientific Research Labs., Seattle, Wash.
PHASE TRANSFORMATIONS IN THE ALLOY, Ti : 8%Al : 1%Mo : 1%V,
by Martin J. Blackburn. Jan 65, 84p
Rept. no. D1-82-0402

Unclassified report

Rept. on Solid State Physics.
Also available from the author.

Descriptors: (*Titanium alloys, Phase studies), (*Phase studies, Titanium alloys), Aluminum alloys, Molybdenum alloys, Vanadium alloys, Microstructure, Heat treatment, Transition temperature, Electron diffraction analysis, Crystal lattices, Transformations, Martensite, Quenching(Cooling), Aging(Materials), Crystal lattice defects, Mechanical properties, Deformation.

The micro-structures of the alloy Ti : 8%Al : 1%Mo : 1%V after various heat treatments have been studied by transmission electron microscopy. An ordering reaction occurs in the alpha phase, the critical temperature for the reaction being approximately 525 C, electron diffraction results are consistent with the formation of a DO sub 19 type superlattice. The beta-phase transforms martensitically when quenched from temperatures above approximately 875 C. Two forms of martensite have been found, a heavily faulted hexagonal or face centered cubic structure alpha' formed at low temperatures and a hexagonal structure alpha double' formed at higher temperatures. Aging of a supersaturated beta-phase or the martensitic structures alpha' or alpha double' result in the formation of mixtures of the alpha and beta-phases, however, the reaction mechanisms are shown to be dependent on the initial structures. The results are related to some of the mechanical properties of the alloy and an attempt is made to account for the differences in properties of Duplex and Mill Annealed material. (Author)

AD-617 420 Div. 17/6, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Dept. of Engineering Mechanics and Materials.
AN ATTEMPT TO DETERMINE THE EFFECT OF ENVIRONMENT ON SLOW CRACK GROWTH IN HIGH-STRENGTH ALUMINUM,
by A. M. Willner and H. H. Johnson. Jul 62, 19p
Contract Nonr328601

Unclassified report

Descriptors: (*Aluminum alloys, Fracture(Mechanics), (*Corrosion, Stresses), Environmental tests, Hardening.

The tests performed indicate that if the phenomenon of slow crack growth due to stress corrosion is present in the two aluminum alloys, 7075-T6 and 2024-T3, its effect is not clearly evident in short time tests performed on specimens having the geometry and dimensions indicated in fig. 1. By using thicker specimens which would exhibit a flat fracture surface and/or running the tests for a longer period of time the effect might be more pronounced. Of all the environments tested, the only one indicating any sign of inducing slow crack growth was the NaCl solution. With this environment the corrosion process may be associated with the removal or breaking away of a protective surface film. Furthermore, the process of stress corrosion may be aided by the presence of an observed hardened zone near the tip of the notch. (Author)

AD-617 489 Div. 14/8, 4/3, 4/4

Wisconsin Univ., Madison. Dept. of Chemistry.
DYNAMIC MECHANICAL PROPERTIES OF POLY(n-BUTYL METHACRYLATE) NEAR ITS GLASS TRANSITION TEMPERATURE.
Revised ed.,
by H. H. Meyer, P.-M. F. Mangin, and John D. Ferry.
16 Nov 64, 8p
AROD 4129:2

Unclassified report

Pub. in Journal of Polymer Science. Part A v3 p1785-92 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 28 Sep 64.

Descriptors: (*Acrylic resins, Dynamics), Mechanical properties, Relaxation time, Glass, Transition temperature, Shear stresses, Viscoelasticity, Thermal expansion, Volume.

The storage and loss shear compliances (J', J'') of poly(n-butyl methacrylate) (number-average molecular weight 320,000) were measured at frequencies between 0.08 and 1.0 cycle/sec. in the temperature range of 18-33C., encompassing the glass transition. Data were obtained both at voluminal equilibrium and as a function of time during the slow isothermal contraction which follows a quench to a temperature near the transition. The latter data were supplemented by dilatometric measurements on similar samples to determine the magnitude of the volume contraction.

Correlation of the dependences of J' and J'' on temperature and on elapsed time (at constant frequency) indicated that the relaxation mechanisms are controlled primarily by free volume. The method of reduced variables was successfully applied to the dependence of J' on temperature and elapsed time using shift factors aT,t calculated from the modified Doolittle equation and the magnitudes of volume contraction measured dilatometrically. The dependence of J'' on both temperature and elapsed time was more complicated, indicating a change in the shape of the retardation spectrum with free volume. The behavior is qualitatively very similar to that of poly(vinyl acetate), previously studied, except that the magnitudes of J' are considerably larger and the thermal expansion coefficient of the free volume is smaller. (Author)

AD-617 552 Div. 17/2, 4/4, 16/3
CFSTI Prices: HC$3.00 MF$0.50

Army Biological Labs., Frederick, Md.
GRAPHITIZATION OF CAST IRON AS AN ELECTRO-BIOCHEMICAL PROCESS IN ANAEROBIC SOILS,
by C. A. H. Von Wolzogen Kuhr and L. S. van der Vlugt. Mar 64, 52p Trans-1021
TT 65-62567
Unclassified report

Trans. of Water; Tijdschrift voor Drinkwatervoorziening (Netherlands) v18 n16 p147-65 Aug 3 1934.

Descriptors: (*Pipes, Corrosion), (*Iron, Corrosion), (*Soils, Corrosion), (*Corrosion, Pipes), Graphite, Sulfates, Reduction(Chemistry), Hydrogen compounds, Sulfides, Electrochemistry, Bacteria, Protective coverings, Corrosion inhibition, Netherlands.

Topics include: Review of the literature; description of the phenomenon of corrosion of cast iron in the ground; sulfate reduction and its occurrance in nature; consideration of the possibility that hydrogen sulfide from sulfate reduction is the cause of iron graphitization; significance of sulfate reduction in the process of iron corrosion in the ground; chemistry of the anaerobic iron-corrosion process with sulfate reduction; process of iron corrosion with sulfate reduction in the laboratory is the same as anaerobic iron corrosion in the ground; iron corrosion processes encountered in waterline practice, considered from the electrochemical point of view, do not differ essentially from each other; concept of 'aggressiveness' of soils; discussion of pipe material and its protection in connection with soil aggressiveness.

AD-617 565 Div. 17/4, 17/6, 31/4
CFSTI Prices: HC$3.00 MF$0.75

Reactive Metals Products, Niles, Ohio.
TITANIUM ALLOY DEVELOPMENT FOR DEEP DIVING SUBMARINE PROGRAM.
Final rept.,
by S. R. Seagle and O. Bertea. 1 Nov 63, 57p
Contract N161 25493
Unclassified report

Descriptors: (*Titanium alloys, Tensile properties), (*Submarines, Titanium alloys), Niobium alloys, Aluminum alloys, Microstructure, Heat treatment, Castings, Additives, Copper, Iron, Vanadium, Molybdenum, Cobalt, Metal plates, Pressure vessels, Submarine hulls.

The beta stabilizers Cu, Fe, V, Mo and Co were added to a Ti-7Al-3Cb base composition in order to increase the yield strength while maintaining statisfactory impact properties. For each beta stabilizer, the amount added was the estimated maximum solubility near room temperature and the maximum soluble in the alpha phase at any temperature. Ingots of these compositions along with the Ti-7Al-3Cb were made by the standard cold wall consumable electrode process. The ingots were fabricated to 0.5 in plate using temperatures below the beta transus except for the initial ingot reduction. The plates were evaluated after an alpha phase anneal and after a beta phase anneal. The stability of the annealed plates was measured by testing after a 1000F-1Hr-AC heat treatment. The testing consisted of room temperature tensile tests and impact tests at -80F and +32F. The effects of the additives and the effect of processing on the tensile and impact properties are discussed. (Author)

AD-617 604 Div. 14/7, 31/4
CFSTI Prices: HC$1.00 MF$0.50

United States Rubber Co., Wayne, N. J.
Research Center.
PROTECTIVE COATINGS FOR DEEP SUBMERGENCE VESSELS.
Quarterly rept. no. 5, 5 Mar-5 Jun 65,
by A. S. Glowacki. 21 Jun 65, 15p
Contract NObs90246, Proj. SR007 03 04, Task 1008
Unclassified report

See also AD-608 873.

Descriptors: (*Moisture proofing, Laminates), (*Underwater equipment, Protective treatments), (*Epoxy plastics, Mechanical properties), (*Laminated plastics, Plastic coatings), Aging(Materials), Liquid immersion tests, Hydrostatic pressure, Fatigue(Mechanics), Glass textiles, Reinforcing materials, Moisture, Absorption.

Low modulus epoxy resin systems lose a significant portion of their original properties after long periods of water immersion. The high modulus resin systems show only a slight loss of properties for an identical exposure period. Epoxy resins flexibilized with low molecular weight epoxides have yielded the best results to date for use as coatings on GRP laminates. New sealing techniques have been developed for our hydrostatic test unit to provide us with more meaningful fatigue data. (Author)

AD-617 665 Div. 17/2, 25/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
THEORY OF DIFFUSION OF INTERSTITIAL ATOMS IN ORDERED ALLOYS OF THE CuPt TYPE,
by M. I. Dekhtyar. 12 May 65, 11p
Rept. no. FTD-TT-65-28
TT 65-62580
Unclassified report

Unedited rough draft trans. of Ukrayins'kyi Fizychnyi Zhurnal (USSR) v8 n2 p183-90 1963.

Descriptors: (*Diffusion, Atoms), (*Alloys, Crystal structure), (*Crystal structure, Diffusion), Copper alloys, Platinum alloys, Crystal lattices, Metallic crystals, Anisotropy, USSR.

The dependence of the diffusion coefficient of CuPt type alloys on the degree of long-range order, the direction of the concentration gradient of interstitial atoms in the interstitials of admixture atoms, the temperature and the composition of the alloy are considered. It is shown that ordering may lead to a considerable change in the value of the diffusion coefficient

and the appearance of pronounced anisotropy. Certain relationships between the jumps of effective energy activation during the transition of alloys to the ordered state may be checked experimentally. (Author)

AD-617 707 Div. 14/4, 29/5
CFSTI Prices: HC$2.00 MF$0.50

Army Natick Labs., Mass.
TEXTILES FOR THERMAL RADIATION PROTECTION.
Technical rept.,
by Earl T. Waldron. Apr 65, 36p Rept. no. TS-132
Proj. 1C0 24401A11304
Unclassified report

Descriptors: (*Textiles, Protective clothing), (*Protective clothing, Military personnel), (*Fire protective clothing, Thermal radiation), (*Fire-resistant textiles, Protective clothing), Nuclear weapons, Fire-resistant coatings, Cotton textiles, Dyes, Nylon, Fibers(Natural), Fibers(Synthetic), Heat transfer, Thermal insulation, Physical properties, Optical properties.

The degree of thermal radiation protection provided by a fabric is influenced by the weight of the material, the type of dyestuffs and chemical finishes used, the synergistic effects from blending the fibers, and the chemistry of the fibers. The net thermal protection provided by an ensemble is further influenced by the ignition characteristics of the outer layer and the manner in which the layers are put together. Reflective sub-layers add protection when used with a diathermanous outer layer; sub-layers that incorporate volatile finishes are a hazard when used with impermeable or slightly permeable outer layers. Of the fibers immediately available from industry, the blends of cotton with nylon showed the best performance in solar furnace and carbon arc tests and their efficiency was increased with available finishes. Of the synthetic fibers examined, experimental Fiber 6 was found to provide significantly greater protection than either the present cotton uniforms or the cotton/nylon blends. It is anticipated that further research with this type of fiber will provide further increases in protection. In the immediate future, the work of this laboratory with Fiber 6 will require a continuing flow of fibers from existing laboratory facilities. Ultimately we may need to construct a pilot plant and production facilities in order to define the reliability of the manufacturing process. (Author)

AD-617 712 Div. 17/4, 27/2
CFSTI Prices: HC$3.00 MF$0.75

Garrett Corp., Phoenix, Ariz. Airesearch Mfg. Div.
MATERIALS INVESTIGATION, SNAP 50/SPUR PROGRAM MECHANICAL PROPERTIES OF TZM.
Rept. for Jan-Oct 64,
by R. L. Salley and E. A. Kovacevich. 25 Jun 65, 63p
Rept. no. APS-5157-R
Contract AF33 615 2289
APL TR-65-51
Unclassified report

Descriptors: (*Molybdenum alloys, Turbine parts), Ductility, Titanium alloys, Carbon alloys, Zirconium alloys, Processing, Forging, Tensile properties, Hardness, Recrystallization, Transition temperature, Creep, Microstructure, Stresses, Heat treatment, Turbine blades, Turbine wheels, Gas turbines.

The results of experimental investigations to determine what carbon content, ingot processing, and forging schedule for the TZM alloy would result in material that would satisfy the requirements of high strength and resistance to creep up to 2000F, long-time (10,000 hours) stability without recrystallization under stress, good fabricability and (room-temperature) ductility, and compatibility with the work medium. The results indicate the development of trends; however, additional tests are recommended to extend the limits of the present data. (Author)

AD-617 733 Div. 17/4, 26/1
CFSTI Prices: HC$5.00 MF$1.25

Solar, San Diego, Calif.
EVALUATION OF RMSRP TUNGSTEN SHEET.
Final rept. for Sep 63-Jul 65,
by F. St. Germain. 9 Jul 65, 190p
Rept. no. ER-1399-6
Contract NOw63 0786d, Proj. 3478 62
Unclassified report

See also AD-607 605.

Descriptors: (*Tungsten, Sheets), (*Sheets, Tungsten), Material forming, Hot working, Drawing(Machine processing), Rolling(Metallurgy), Joining, Welding, Brazing, Diffusion bonding, Panels(Structural), Structural properties, Tests, Deformation, Refractory metals, Mechanical properties.

Tensile property data for several gages of material encompassing the temperature range from ambient to 3000 F are presented. Confidence limits on the elevated temperature mechanical properties for tungsten are also included. Results of the compression test evaluations up to 1800 F for 0.060- and 0.100-inch sheet are also presented in this report. Five joining techniques for tungsten were investigated and of the five, diffusion bonding and mechanical joining showed the most promising. Tensile and bond shear strength data for ambient and elevated temperature joint evaluation tests are reported and discussed. An investigation was conducted to determine the formability characteristics of RMSRP tungsten sheet in the area of predicting and developing forming limits and establishing optimum forming temperatures for several conventional processes. Formability limits were established for brake form, dimpling, corrugating, joggling, and deep draw forming processes. Theoretical formability limit graphs were experimentally established for optimum forming temperatures and part geometry. The formability behavior of RMSRP tungsten for each of the forming processes is discussed. Structural element bend test panels were fabricated from thin gage RMSRP tungsten sheet. Attempts were made to join the panels by diffusion bonding and mechanical joining (riveting). Diffusion bonding proved to be the only successful method. Mechanical joining was unsuccessful due to extensive panel cracking. (Author)

AD-617 759 Div. 17/4, 17/5, 14/6, 14/8, 26/1
CFSTI Prices: HC$2.00 MF$0.50

Ad Hoc Machine Tool Advisory Committee, Washington, D. C.
TRENDS IN HARD MATERIALS,
by John N. Dick, Charles P. Downer, Fred L. Hill, and Robert L. Vaughn. Jan 65, 33p
Unclassified report

Rept. of Task Force No. 3 to the Dept. of the Air Force.

Descriptors: (*Materials, Hardness), (*Machining, Hardness), (*Metals, Hardness), Steel, Titanium alloys, Refractory metal alloys, Refractory metals, Titanium, Nickel alloys, Cobalt alloys, Chromium alloys, Machine tools, Cutting tools, Composite materials, Laminates, Filaments, Airframes.

A review of the ratio of hard to soft materials indicates a current in-house status of 35% difficult-to-machine versus 65% easy-to-machine materials. The 8-10 year future time period reverses this ratio, suggesting 70% difficult-to-machine versus 30% easy-to-machine materials. (Author)

AD-617 778 Div. 17/2
CFSTI Prices: HC$3.00 MF$0.75

RIAS, Inc., Baltimore, Md.
ENVIRONMENT-SENSITIVE MECHANICAL BEHAVIOR STATUS AND PROBLEMS.
Technical rept.,
by A. R. C. Westwood. Jun 65, 82p
Rept. nos. 65-5, TR-6
Contracts Nonr416200, DA31 124AROD63
Unclassified report

Descriptors: (*Materials, Degradation), (*Fracture-(Mechanics), Environmental tests), (*Corrosion, Stresses), (*Liquid metals, Compatibility), (*Gases, Compatibility), Mechanical properties, Films, Surfaces, Crystal lattice defects, Liquids, Surface-active substances, Corrosive gases, Corrosive liquids, Brittleness.

During the past few years, materials scientists have expressed a renewed interest in the study of environment-sensitive mechanical behavior. This interest has resulted in the discovery of new phenomena, the development of some new concepts, the profitable application of knowledge from other areas of study to this area, and the application of recently developed experimental techniques to such 'well-established' phenomena as stress-corrosion cracking and liquid metal embrittlement. This paper describes some of this recent work, and discusses possible mechanisms for the phenomena described. Areas where more work is required are indicated. (Author)

AD-617 782 Div. 14/6, 14/8
CFSTI Prices: HC$2.00 MF$0.50

New York Univ., N. Y. Radiation and Solid State Lab.
ENERGY TRANSFER DURING TRANSIENT NUCLEAR PULSES.
Semi-annual rept. no. 1, 1 May-31 Oct 64,
by Hartmut P. Kallmann. Nov 64, 28p
Contract DA 28 043AMC00129E, Proj. 1C0 14501B11A
Unclassified report

Descriptors: (*Electric insulation, X-rays), (*Styrene plastics, Electric insulation), (*X-rays, Electric insulation), Electric cables, Coaxial cables, Capacitors, Sandwich construction, Polyester plastics, Surface properties, Degradation, Polarization, Electric discharges, Voltage.

A method is proposed for reduction of the radiation response in cables or capacitors. This proposal is based on the above mentioned charge accumulation near interfaces. It emphasizes the design of an insulator composed of various thin layers of material. Each layer should have a thickness less than the observed width of the charge layers (.25 to .5 mm). The layers should eventually be separated by thin films of mylar or similar material, or they should be firmly pressed together. We feel that a radiation-insensitive coaxial cable could be designed along the lines of this suggestion. However, a technical development of such a cable is not within the scope of our research contract.

AD-617 785 Div. 17/5, 17/2
CFSTI Prices: HC$1.00 MF$0.50

Battelle Memorial Inst., Columbus, Ohio.
STRUCTURAL CHANGES IN HIGH-STRENGTH STEEL ASSOCIATED WITH STRESS CORROSION AND ITS RELATIONSHIP TO DELAYED FAILURE.
Quarterly progress rept. no. 1, 29 Jun-28 Sep 64,
by D. A. Vaughan, D. I. Phalen, A. B. Tripler, and C. M. Schwartz. 28 Sep 64, 11p
Contract NOw64 0267c, Proj. WR007 05 01
Unclassified report

Descriptors: (*Steel, Corrosion), (*Corrosion, Steel), (*Stresses, Corrosion), Microstructure, Electron diffraction analysis, X-ray diffraction analysis, Fracture(Mechanics), Heat treatment, Quenching(Cooling), Metallography.

The investigation of structural characteristics of AISI 4340 steel quenched and tempered to produce three strength levels has been initiated as a basis for the planned studies of these materials under conditions of stress-corrosion attack. Due to problems in contract negotiation, this program was delayed in starting. However, the experimental work, plus a literature study, has been initiated. Preliminary electron metallographic studies of the steel have been carried out in the process of developing techniques. Electron diffraction and X-ray diffraction results are being correlated with the microstructure. (Author)

AD-617 838 Div. 14/8

Explosives Research and Development Establishment, Waltham Abbey (England).
INTERNAL PRESSURE OF CRYSTALLINE POLYMERS,
by D. Sims. Nov 64, 6p
Rept. nos. WAC/160/054, Offprint-65/8
Unclassified report

Pub. in Polymer v6 p220-2 1965(Copies available only to DDC users).

Descriptors: (*Polymers, Pressure), (*Polyethylene plastics, Pressure), Thermal expansion, Compressive properties, Formaldehyde, Hydrocarbons, Crystals, Great Britain.

Internal pressure values were determined for crystalline polyethylene, polyoxymethylene, polytetramethylene oxides, dotriacontane, and eicosane. In general, the internal pressure of the crystalline solids were found to be greater than that of the corresponding melts.

AD-617 853 Div. 17/2, 14/2

North Carolina State Univ., Raleigh. Dept. of Engineering Research.
A TERNARY BORIDE WITH CHROMIUM CARBIDE (CR23C6) STRUCTURAL AND EQUILIBRIUM CONDITIONS IN THE NICKEL FACET OF THE TERNARY SYSTEM NICKEL-NIOBIUM-BORON (Ein Ternares Borid mit Chromkarbid-(Cr23C6)-Struktur und die Lage der Gleichgewichte in der Nickelecks des Dreistoffsystems Nickel-Niob-Bor),
by J. D. Schobel and H. H. Stadelmaier. 1964, 3p
AROD 5010:1
Unclassified report

Pub. in Metall Sonderuck Aus v12 p1285-7 Jan 18 1964 (Copies available only to DDC users).
Text in German.

Descriptors: (*Nickel alloys, Grain structures-(Metallurgy)), (*Niobium alloys, Grain structures-(Metallurgy)), (*Boron alloys, Grain structures-(Metallurgy)), (*Borides, Grain structures(Metallurgy)), Chromium compounds, Carbides, Phase studies, Thermodynamics.

12. Mathematical Sciences

AD-617 270 Div. 15/1, 25/4
CFSTI Prices: HC$2.00 MF$0.50

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
DISCONTINUOUS VARIATIONAL PROBLEMS,
by H. Gardner Moyer. Dec 64, 26p
Memo no. RM-252J
Contract AF49 638 1207

Unclassified report

Presented at the IBM Scientific Computing Symposium on Control Theory and Applications, Yorktown Heights, New York October 1964.

Descriptors: (*Calculus of variations, Functional analysis), (*Optical phenomena, Calculus of variations), Reflection, Refraction, Orbital trajectories, Interplanetary trajectories, Optimization.

Variational problems are analyzed that specify jump discontinuities in the state variables. The solution extremals are required to jump when they reach a manifold of dimension n-q (n is the number of state variables). Two approaches to these problems are presented. The first approach is geometrical and therefore loses most of its practicality as the number of state variables is increased beyond two. However, it provides valuable diognostic insight. The boundary of the reachable set is regarded as a wavefront that is determined by wavelets. This principle is used to construct the wavefront just after the discontinuity and to determine the normal to its tangent plane. Of course the Lagrange multiplier vector is parallel to this normal. When q is equal to one there are at most two directions in which the extremal can be continued. The second approach is analytic and therefore much more flexible and powerful. The Lagrange multipliers are obtained from a set of nonlinear equations. They are underdetermined when q is greater than one. After the discontinuity the extremals fill an n-dimensional volume regardless of the value of q. (Author)

AD-617 277 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Washington Univ., Seattle.
LINEAR COMPLETELY INTEGRABLE PARTIAL DIFFERENTIAL EQUATIONS,
Technical rept.,
by Harold H. Johnson. Jun 65, 11p
Rept. no. TR-26
Contract Nonr477 15, Proj. NR043 186

Unclassified report

Descriptors: (*Partial differential equations, Matrix algebra), Algebra, Linear systems, Transformations-(Mathematics).

Completely integrable systems of partial differential equations which are linear are studied as a vector space of commuting matrices. When one is diagonalizable they are all diagonalizable. Solutions may be expressed in exponential matrix form. (Author)

AD-617 283 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

North Carolina State Univ., Raleigh.
CLOSEST PACKING OF EQUAL SPHERES AND RELATED PROBLEMS.
Master's thesis,
by Michael Allan Blackledge. 1965, 50p

Unclassified report

Descriptors: (*Spheres, Algebraic geometry), (*Algebraic geometry, Spheres), Projective geometry).

The two-dimensional packing problem is discussed, using the concept of the lattice, and the lattice which determines the closest packing of equal circles is presented. Also, closest packing in terms of density is discussed and the density value for the closest regular packing is derived. The idea of sphere-clouds is introduced and used as an introduction to the closest packing of spheres. Lattice-like arrangements of spheres are considered, and the density of such a packing is determined. Two proofs, one by John Leech and one by A. H. Boerdijk, are presented to show that it is impossible for thirteen spheres of equal radius to be in contact with a fourteenth sphere of the same radius. A second related problem is presented, which when generalize reduces to the problem of finding the number of figures with (N + 1) vertices in N-space, choosing the vertices from given sets of points on given lines passing through a common point, subject to the restriction that no N lines lie in the same (N -1)-space. A solution by the author is presented and compared with a published solution. (Author)

AD-617 306 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

Utah Univ., Salt Lake City.
THE BOUNDEDNESS, STABILITY AND REDUCIBILITY OF LINEAR HOMOGENEOUS SYSTEMS.
Master's thesis,
by Max Robert Lund. Jun 65, 46p

Unclassified report

Descriptors: (*Differential equations, Linear systems), Matrix algebra, Stability, Complex variables.

Linear systems of first order differential equations dX/dt = A(t)X, X(t sub 0) = C is considered, where C is a square, non-singular, constant matrix and A(t) is a square matrix of complex valued functions of the real argument t defined over some interval containing t sub 0. Three interdependent questions concerning these equations are discussed: (1) the boundedness of the matrix integral X(t), (2) the stability of the system, and (3) the exchange of the system for an equivalent system possessing a constant coefficient matrix. With regard to the last consideration, often called 'reducibility', four propositions by the Soviet mathematician V. A. Yakabovic are introduced. These results appear to be significant generalizations of the Lyapunov criterion concerning the reducibility of linear systems possessing periodic coefficient matrices. (Author)

AD-617 310 Div. 15/1

Saint Louis Univ., Mo.
ITERATIVE METHODS FOR NON-LINEAR SYSTEMS.
Master's thesis,
by Robert Frederick Woodnal. 1965, 70p

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Iterative methods, Nonlinear differential equations), (*Nonlinear differential equations, Iterative methods), Functional analysis, Equations, Perturbation theory.

AD-617 318 Div. 15/1, 25/6
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
INVARIANT IMBEDDING AND NONVARIATIONAL

PRINCIPLES IN ANALYTICAL DYNAMICS,
by Richard Bellman, Harriet Kagiwada, and Robert Kalaba. Jul 65, 16p
Memo. no. RM-4591-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Integral equations, Dynamics), (*Statistical mechanics, Integral equations), Invariance, Integration, Harmonic oscillators.

An integration theory is provided for the canonical equations of motion with parallels to the classical theory of Jacobi. The new approach is applicable to the general case where there is no variational principle underlying the equations of motion. (Author)

AD-617 352 Div. 15/1, 2/7, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Kaman Nuclear, Colorado Springs, Colo.
FEASIBILITY OF A MATHEMATICAL/STATISTICAL TECHNIQUE TO ESTIMATE MAXIMUM AEROSPACE VEHICLE RESPONSE TO WIND.
Final scientific rept. for 1 Jul 64-31 Mar 65,
by C. Eugene Buell. 31 Mar 65, 75p
Rept. no. KN-65-699(FR)
Contract AF19 628 4299, Proj. 8624, Task 862402
AFCRL 65-369

Unclassified report

Descriptors: (*Aerospace craft, Wind), (*Wind, Aerospace craft), (*Mathematical prediction, Meteorological parameters), Feasibility studies, Statistical analysis, Motion.

The feasibility of a mathematical/statistical technique for determining the distribution of maximum aerospace vehicle structural and control response from the more advanced presentations of upper-wind climatology (means, standard deviations, and inter-level correlation matrices of orthogonal wind components at equally spaced levels) is investigated. It is concluded that the development of such a technique is feasible but not without some problem areas. The steps of development of such a technique appear to be as follows: First, the development of a reasonable linear system of differential equations that is equivalent (in a special sense) to the dynamical equations of motion and response of the vehicle. Second, the establishment of the relation of response statistics of the vehicle to the wind statistics by means of the preceding differential equations. Third, from the statistics of vehicle response, to determine the statistics of the maximum vehicle response. Some preliminary results in several of the important areas are outlined. (Author)

AD-617 353 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Texas Univ., Austin. Computation Center.
AN ERROR ANALYSIS OF KAISER'S ALGORITHM FOR DIAGONALIZING A REAL SYMMETRIC MATRIX.
Master's thesis,
by Houston I. Lewis, Jr. May 65, 73p
Rept. no. TNN-44
Grants NSF GP217, DA AROD31 124G388
AROD 3772:13

Unclassified report

Descriptors: (*Matrix algebra, Errors), (*Iterative methods, Matrix algebra), Transformations(Mathematics), Programming(Computers).

This report describes an error analysis of Kaiser's algorithm for diagonalizing a real symmetric matrix. Use of the Kaiser algorithm to produce an eigenvalue is compared timewise with the Householder-Ortega algorithm. The divergence of maximal bounds for iterative processes from the actual cumulative errors as the number of iterations increases is considered. (Author)

AD-617 371 Div. 15/1, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Corp., El Segundo, Calif.
A SECOND-ORDER PARAMETER OPTIMIZATION PROCEDURE,
by B. L. Beskind. 31 May 65, 22p
Rept. no. TDR-469(5560-20)-1
Contract AF04 695 469
SSD TR-65-57

Unclassified report

See also AD-426 103.

Descriptors: (*Mathematical models, Optimization), Taylor's series, Guided missile trajectories, Hamiltonian, Matrix algebra.

In the past, the optimization of complex systems has been accomplished by iterative steps in a gradient direction determined from a linearized model of the system. When the system can be described in terms of time-invariant parameters, it is relatively straightforward to approximate the system's behavior with second-order expansions rather than first-order, and to then optimize the system on the basis of its approximated behavior. Two different mathematical methods for accomplishing this optimization are described. Numerical examples indicate that a second-order optimization method may be significantly faster and more versatile than the linear gradient method, and that further investigation is warranted. (Author)

AD-617 395 Div. 15/2, 30/5
CFSTI Prices: HC$1.00 MF$0.50

New York Univ., N. Y.
STATISTICAL CONFIDENCE INTERVALS, THEIR USES AND MISUSES IN RELIABILITY ENGINEERING,
by John H. K. Kao. May 65, 5p
Contract Nonr28562

Unclassified report

Descriptors: (*Reliability(Electronics), Statistical analysis), (*Statistical analysis, Reliability(Electronics)), Statistical tests, Engineering, Reliability.

AD-617 419 Div. 15/2
CFSTI Prices: HC$2.00 MF$0.50

Measurement Analysis Corp., Los Angeles, Calif.
SPECTRA OF NONSTATIONARY RANDOM PROCESSES.
Final rept. for Mar-Nov 64,
by Julius S. Bendat and George P. Thrall.
Mar 65, 33p Rept. no. MAC-403-03
Contract AF33 615 1418, Proj. 1370, Task 137005
FDL TR-64-198

Unclassified report

Descriptors: (*Statistical processes, Integral transforms), Time, Frequency, Founer analysis, Probability, Aerospace craft, Dynamics.

Mathematical properties are defined and developed for three different types of spectra which can be associated with nonstationary random process: double frequency spectra, time varying spectra, and time averaged spectra. The

double frequency spectra is the double Fourier transform of the nonstationary covariance function and indicates the correlation between frequencies. The time varying spectra, based upon narrow band filtering and ensemble averaging, indicates relations between frequency and time. The time averaged spectra is obtained by taking a time average of the time varying spectra. A significant measurement problem exists for the first two representations because they are two-dimensional functions, whereas the third representation is directly measurable. However, the third procedure is restricted in its applications, while the first two are suitable for general problems. Each of these spectra is computed for a particular nonstationary example, and some experimental results are shown to verify the theory. (Author)

AD-617 432 Div. 15/1

California Univ., Los Angeles.
A THEOREM ON MAPPINGS INTO RIEMANN SURFACES OF INFINITE GENUS,
by Leo Sario. 22 Oct 63, 11p
Grant DA AROD31 124G499
AROD 1517:74
Unclassified report

Pub. in Transactions of the American Mathematical Society v117 n5 p276-84 May 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mapping(Transformations), Complex variables), (*Complex variables, Mapping(Transformations)), Functions, Integral equations, Theorems.

AD-617 445 Div. 15/1

Polytechnic Inst. of Brooklyn, N. Y.
LYAPUNOV STABILITY AND PERIODIC SOLUTIONS,
by Jane Cronin. 1963, 7p
Contract DA31 124ARO D56
AROD 2428:6
Unclassified report

Pub. in Reimpreso del Boletin de la Sociedad Matematica Mexicana p22-7 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Differential geometry, Stability), Theory.

AD-617 449 Div. 15/2

Ordnance Research Lab., Pennsylvania State Univ., University Park.
STOCHASTIC GREEN'S FUNCTIONS,
by G. Adomian. 1964, 40p
Unclassified report

Pub. in Symposia in Applied Mathematics. Proceedings v16, Stochastic Processes in Mathematical Physics and Engineering. p1-39 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Green's function, Stochastic processes), (*Stochastic processes, Green's function), Operators-(Mathematics), Propagation, Field theory.

A new approach is presented to the theory of random equations for use in physical problems. After a basic summary of necessary ideas and definitions relevant to stochastic processes, the paper develops a linear transformation theory which allows the operators as well as the operand to be stochastic. The statistics of a transformed process are found in terms of the known statistics of the original process and a 'stochastic Green's function'. The problem of determining a stochastic Green's function for a linear stochastic differential operator is studied. (Detailed results for the random sampling of a random process have been obtained in the author's dissertation but only an initial form is shown in the paper to show the nature of the integral kernel or stochastic Green's function.) Interesting applications to 'systems' problems, quantum theory, and propagation in random media are briefly suggested.

AD-617 458 Div. 15/1

California Univ., Los Angeles.
ELEMENTARY REMARKS ON PROBLEMS OF MIXED TYPE,
by R. M. Redheffer. 19 Aug 63, 14p
Unclassified report

Pub. in Journal of Mathematics and Physics v43 n1 p1-14 Mar 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Boundary value problems, Theorems), Functions, Partial differential equations.

AD-617 473 Div. 15/1, 28/5
CFSTI Prices: HC$1.00 MF$0.50

System Research, Ltd., Richmond (England).
A STUDY OF GROUP DECISION MAKING AND COMMUNICATION PATTERNS UNDER CONDITIONS OF STRESS AND OVERLOAD, WHEN THE PARTICIPANTS ARE PERMITTED TO FUNCTION AS A SELF-ORGANISING SYSTEM.
Quarterly technical status rept. no. 1, 1 Jan-31 Mar 65. 31 Mar 65, 11p
Contract DA91 591EUC3607
Unclassified report

Continuation of Contract DA91 591EUC3216.

Descriptors: (*Decision making, Stress(Psychology)), (*Game theory, Group dynamics), Performance(Human), Communication theory, Noise, Decision theory, Programming(Computers), Simulation, Interception probabilities, Trajectories, Probability, Display systems, Reliability, Great Britain.

The group system was modified to provide individual adaptive facilities on each of the two subject consoles. The report discusses the effect of introducing a third decision-maker into the two-person group.

AD-617 475 Div. 15/1

Rochester Univ., N. Y.
CROSS-EXAMINING PROPOSITIONAL CALCULUS AND SET OPERATIONS,
by John F. Randolph. 1965, 12p
Grant AF AFOSR481 64, Proj. 9769, Task 976906
AFOSR 65-0863
Unclassified report

Pub. in American Mathematical Monthly v72 n2 p117-27 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Mathematical logic, Set theory), (*Set theory, Mathematical logic), Algebras.

AD-617 476 Div. 15/1

California Univ., Berkeley.
ALGEBRAIC RINGS,

by Marvin J. Greenberg. 7 Feb 63, 12p
Grant AF AFOSR62 57, Proj. 9749, Task 974902
AFOSR 65-0865

Unclassified report

Pub. in Transactions of the Mathematical Society v111 n3 p472-81 Jun 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Algebraic geometry, Rings), (*Rings, Algebraic geometry), Algebraic topology.

An algebraic ring is roughly speaking an associative algebra which is an algebraic variety. Proof is presented that (1) an algebraic ring is Artinian, (2) an algebraic ring is, under its addition, a unipotent algebraic group, and (3) the unit group of an algebraic ring is a Zariski open subset. Furthermore, some structure theorems for algebraic rings are proved: a commutative local ring variety of positive characteristic is a finite algebra over a ring of Witt vectors, and a simple ring variety is a matric ring (over an algebraically closed field. (Author)

AD-617 477 Div. 15/1

Massachusetts Inst. of Tech., Cambridge.
THE KERVAIRE INVARIANT OF (8k+2)-MANIFOLDS,
by Edgar H. Brown, Jr. and Franklin P. Peterson.
17 Aug 64, 5p
Grant DA AROD31 124G707
AROD 2246:12

Unclassified report

Pub. in Bulletin of the American Mathematical Society v71 n1 p190-3 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Invariance, Algebraic topology), (*Algebraic topology, Invariance), Theorems, Mapping-(Transformations).

AD-617 478 Div. 15/1

Brandeis Univ., Waltham, Mass.
RELATIONS AMONG CHARACTERISTIC CLASSES: II,
by Edgar H. Brown, Jr. and Franklin P. Peterson.
12 May 64, 10p
Grant NSG GP1636
AROD 2246:13

Unclassified report

Pub. in Annals of Mathematics v81 n2 p356-63 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Algebraic topology, Theory), Groups(Mathematics), Prime numbers, Algebras.

AD-617 479 Div. 15/1

North Carolina State Univ., Raleigh. School of Physical Sciences and Applied Mathematics.
THE EXISTENCE OF PERIODIC SOLUTIONS OF NONLINEAR OSCILLATORS.
Revised ed.,
by J. H. Heinbockel and R. A. Struble. 9 Jul 64, 32p
Grant DA AROD31 124G630
AROD 4105:5

Unclassified report

Pub. in Journal Social Industrial Applied Mathematics v13 n1 p6-36 Mar 1965 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 6 Mar 64.

Descriptors: (*Differential geometry, Nonlinear systems), Trajectories, Nonlinear differential equations, Theorems, Potential theory, Motion.

AD-617 480 Div. 15/1

North Carolina State Univ., Raleigh.
MOTION OF TWO WEAKLY COUPLED NONLINEAR OSCILLATORS,
by Thomas G. Proctor and Raimond A. Struble.
4 Sep 64, 11p
AROD 4105:14

Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v18 n4 p293-303 1965 (Copies available only to DDC users).

Descriptors: (*Oscillators, Dynamics), Nonlinear systems, Oscillation, Hamiltonian, Harmonic analysis.

The purpose of this investigation was to establish the existence of almost periodic solutions for analytic dynamical systems consisting of two weakly coupled oscillators and to describe some qualitative features of these solutions. Hamiltonian formalism was used in the mathematics of this dynamical problem to realize simplicity of presentation and to agree with much of the literature concerning the problem. The method consisted primarily in the application of an invariant curve theorem due to Moser. The basic problem was given in terms of a Hamiltonian with the usual displacement and momentum variables. By changing to action-angle variables, by selecting a particular value of the energy and by eliminating time from the equations of motion, the study of the free oscillations of the two weakly coupled oscillators was reduced to the consideration of a one dimensional oscillator which is weakly forced with periodic forcing.

AD-617 481 Div. 15/1, 30/2

Princeton Univ., N. J.
AN ALGORITHM FOR THE MACHINE CALCULATION OF COMPLEX FOURIER SERIES,
by James W. Cooley and John W. Tukey. 17 Aug 64, 6p
Grant DA AROD31 124G130
AROD 1715:67

Unclassified report

Pub. in Mathematics of Computation v19 n90 p297-301 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Series, Fourier analysis), (*Fourier analysis, Series), (*Programming(Computers), Series), Iterative methods.

AD-617 491 Div. 15/1

Texas Univ., Austin.
ON THE USE OF THE MODIFIED SUCCESSIVE OVER-RELAXATION METHOD WITH SEVERAL RELAXATION FACTORS,
by David F. Young, Mary F. Wheeler, and James A. Downing. 1962, 6p
Contract Nonr186634; Grant NSF GP217
AROD 3772:7

Unclassified report

Pub. in Proceedings of the IFIP Congress p177-82 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Partial differential equations, Iterative methods), (*Iterative methods, Partial differential equations), Linear systems, Optimization, Matrix algebra, Set theory.

AD-617 492 Div. 15/1, 30/2

Texas Univ., Austin.
ALGORITHM 253 (F2). EIGENVALUES OF A REAL SYMMETRIC MATRIX BY THE QR METHOD,
by P. A. Businger. 17 Aug 64, 3p
Grants NSF GP217, DA AROD31 124G388
AROD 3772:10

Unclassified report

Pub. in Communications of the ACM v8 n4 p217-8 Apr 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Matrix algebra, Programming-(Computers)), Transformations(Mathematics), Real numbers.

AD-617 586 Div. 15/2

Minnesota Univ., Minneapolis. Dept. of Mathematics.
RATIO LIMIT THEOREMS FOR MARKOV CHAINS,
by J. F. C. Kingman and Steven Orey. 27 Jun 63, 5p
Grant AF AFOSR380 63
AFOSR 65-0868

Unclassified report

Pub. in Proceedings of the American Mathematical Society v15 n6 p907-10 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Probability, Theorems), (*Theorems, Probability), Measure theory, Distribution theory, Time.

AD-617 587 Div. 15/1

Minnesota Univ., Minneapolis.
EIGENVALUES OF NON-NEGATIVE MATRICES,
by William E. Pruitt. 1 Jul 64, 4p
Grant AF AFOSR380 63, Proj. 9749, Task 974902
AFOSR 65-0870

Unclassified report

Pub. in The Annals of Mathematical Statistics v35 n4 p1797-1800 Dec 1964.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Matrix algebra, Probability), Transformations(Mathematics), Measure theory.

AD-617 597 Div. 15/1
CFSTI Prices: HC$4.00 MF$0.75

Texas Univ., Austin. Computation Center.
FINDING EIGENVALUES WITH LAGUERRE ITERATIONS.
Master's thesis,
by Robert Mark Hansard. May 65, 105p
Rept. no. TNN-45
Grants NSF GP217, DA AROD31 124G388
AROD 3772:12

Unclassified report

Descriptors: (*Matrix algebra, Iterative methods), (*Iterative methods, Matrix algebra), Transformations-(Mathematics), Polynomials.

The use of Laguerre iterations for finding eigenvalues of matrices is considered. The algorithm discussed here is designed for the calculation of the eigenvalues of real square matrices of orders up to 100. The method is applicable to complex matrices also. The method consists of reducing the given matrix A to Hessenberg form H by similarity transformations and then conducting an iterative search for the eigenvalues of H using the method of Laguerre. (Author)

AD-617 606 Div. 15/2, 18/3
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
STATISTICAL ESTIMATION BY THE EMPIRICAL BAYES METHOD: SOME EXTENSIONS AND LOGISTICAL APPLICATIONS,
by S. James Press. Jun 65, 45p
Memo. no. RM-4442-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Statistical processes, Logistics), (*Logistics, Statistical processes), Statistical analysis, Reliability, Maintenance, Probability, Operations research.

This report contains a presentation of the empirical Bayes procedure for improving existing methods of estimating statistical decision parameters which occur in such logistical problems as reliability, maintenance, and supply. It consists essentially of estimating a parameter by using an approximate Bayes estimator that does not depend on any previous information, other than earlier observations. The author presents estimators for the univariate and multivariate exponential family of distributions, for distributions with nuisance parameters, and for the distribution of a family of random variables (Poisson process). (Author)

AD-617 611 Div. 15/2, 1/4
CFSTI Prices: HC$2.00 MF$0.50

Measurement Analysis Corp., Los Angeles, Calif.
AN ANALYSIS OF AMPLITUDE PROBABILITY MEASUREMENTS.
Final rept. for Mar-Dec 64,
by George P. Thrall. Jan 65, 40p Rept. no. MAC-403-01
Contract AF33 615 1418, Proj. 1370, Task 137005
FDL TDR-64-116

Unclassified report

See also AD-297 031.

Descriptors: (*Probability, Measurement), (*Mathematical models, Stochastic processes), Vibration, Dynamics.

Techniques for measuring amplitude probabilities and probability densities are summarized and previous results on the statistical uncertainty of such measurements are reviewed. A rigorous mathematical model of probability measurements is derived. It is shown that unknown correlations in the parameters of the model make it impossible to develop explicit expression for the mean square estimation error. Results are presented of a computer simulation of amplitude probability estimates and comparisons are made between experimental and computed mean square errors. (Author)

AD-617 625 Div. 15/2

Minnesota Univ., Minneapolis.
CONSTRUCTION OF A MARKOV PROCESS FROM HITTING PROBABILITIES,

by W. Feller. 1963, 20p
Grant AF AFOSR380 63
AFOSR 65-0869

Unclassified report

Pub. in Journal of Mathematics and Mechanics v13 n5 p857-74 Sep 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Statistical processes, Probability), Measure theory, Distribution theory, Topology, Functional analysis.

AD-617 626 Div. 15/1

Manitoba Univ. (Winnipeg).
THE EXPONENTS OF INCIDENCE MATRICES,
by A. L. Dulmage and N. S. Mendelsohn. 17 Jun 63, 11p
Grant AF AFOSR62 235
AFOSR 65-0867

Unclassified report

Pub. in Duke Mathematical Journal v31 n4 p575-84 Dec 1964 (Copies available only to DDC users).

Descriptors: (*Matrix algebra, Combinatorial analysis), (*Combinatorial analysis, Matrix algebra), Graphics, Stochastic processes.

AD-617 628 Div. 15/1, 30/2

UCLA Computing Facility, Univ. of California, Los Angeles.
FERMAT NUMBERS AND MERSENNE NUMBERS,
by J. L. Selfridge and Alexander Hurwitz. 12 Aug 63, 4p

Unclassified report

Research supported by Office of Naval Research, Washington, D. C.
Pub. in Mathematics of Computation v18 n85 p146-8 Jan 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Number theory, Programming(Computers)), Prime numbers, Tests.

An IBM 7090 computer program, and results of testing Mersenne numbers M(p) = 2(p) - 1 with p prime, p < 5,000, have been described by Hurwitz. This paper describes modifications made to his program, and further computational results. The main results are that the Fermat number F14 is composite and that 2(p) - 1 is composite if 5000 < p < 6000.

AD-617 638 Div. 15/1, 30/2

Texas Univ., Austin.
ALGORITHM 254 (F2). EIGENVALUES AND EIGENVECTORS OF A REAL SYMMETRIC MATRIX BY THE QR METHOD,
by P. A. Businger. 8 Dec 64, 2p
Grants NSF GP217, DA ARO D31 124 G388
AROD 3772:11

Unclassified report

Pub. in Communications of the ACM v8 n4 p218-9 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Matrix algebra, Programming(Computers)), Transformations(Mathematics), Real numbers.

AD-617 652 Div. 15/2

Johns Hopkins Univ., Baltimore, Md.
A DISTRIBUTION-FREE TWO-SAMPLE TEST ON A CIRCLE,
by Stanley Wheeler and G. S. Watson. 1962, 2p

Unclassified report

Pub. in Biometrika v51 n1/2 p256-7 1964 (Copies available only to DDC users).
Sponsored by ONR.

Descriptors: (*Statistical tests, Rings), (*Sampling, Population(Mathematics)), Distribution theory, Probability.

Samples of n sub 1 and n sub 2 are taken from two populations of unit vectors or directions in two dimensions. A distribution-free test is here provided of the null hypothesis that the two populations have the same form. It could be useful for detecting a difference of mean directions in unimodal populations. (Author)

AD-617 658 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A NECESSARY AND SUFFICIENT CONDITION OF ONE OPTIMUM PROBLEM FOR A LINEAR DIFFERENTIAL EQUATION WITH DELAY,
by I. A. Ozhiganova. 20 May 65, 15p
Rept. no. FTD-TT-65-450
TT 65-62573

Unclassified report

Unedited rough draft trans. of Institut Khimicheskogo Mashinostroeniya. Trudy (USSR) v25 p172-80 1963.

Descriptors: (*Differential equations, Optimization), (*Optimization, Differential equations), Control, Motion, Time-lag theory, USSR.

AD-617 716 Div. 15/2, 18/3
CFSTI Prices: HC$1.00 MF$0.50

Naval Missile Center, Point Mugu, Calif.
A METHOD OF DETERMINING A CONFIDENCE INTERVAL FOR AVAILABILITY.
Miscellaneous publication,
by W. R. Keesee. 9 Jul 65, 10p
Rept. no. NMC-MP-65-8

Unclassified report

Descriptors: (*Reliability, Statistical analysis), (*Operations research, Maintenance), (*Maintenance, Operations research), Weapon systems, Failure-(Mechanics), Maintainability, Mathematical prediction, Logistics.

This report presents a method of determining a confidence interval for availability when it is estimated from the mean time between equipment failures and the mean time to repair these failures. When the failure rate and repair rate of a system are constants independent of time, it can be shown that the estimates of mean time between failures and of mean time to repair the failures can be combined to have the variance ratio density. The estimated availability can be shown to have a density which is a function of the variance ratio density. This relation can then be used to obtain equations for a confidence interval for availability. An example is included to demonstrate the procedure of placing a confidence interval about the estimated availability. (Author)

AD-617 739 Div. 15/1
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana. Dept. of Mathematics.
NOTES ON SPECTRAL THEORY.
Technical rept.,
by C. Ionescu Tulcea. Dec 64, 89p
Contract DA31 124ARO D288, Proj. 20014501B14C
AROD 5254:3
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Measure theory, Functional analysis), (*Operators(Mathematics), Functional analysis), (*Functional analysis, Measure theory), Theory, Topology.

The report contains definitions and results concerning semi-spectral and spectral families of Radon measures. Topics covered include: (a) Semi-spectral and spectral families of Radon measures; (b) Remarks on scalar operators; (c) Abstract valued measures associated with operators; (d) Scalar dilations and scalar extensions of operators on Banach spaces; and (e) Conditions implying that a subscalar operator is scalar.

AD-617 743 Div. 15/2
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York.
ON OPTIMAL STOPPING IN A CLASS OF UNIFORM GAMES.
Mimeograph Series,
by Yuan S. Chow and H. Robbins. Jun 65, 18p
Rept. no. MS-42
Contracts Nonr110026, Nonr26659
Unclassified report

Prepared in cooperation with Purdue Univ., Lafayette, Ind.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Game theory, Stochastic processes), (*Stochastic processes, Game theory), Optimization, Decision theory.

AD-617 770 Div. 15/2
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
APPLICATION GENERALITY OF SOME RESULTS FOR ANALYSIS OF VARIANCE,
by John E. Walsh. 7 Jul 65, 13p Rept. no. SP-2140
Unclassified report

Descriptors: (*Analysis of variance, Combinatorial analysis), Mathematical models, Statistical tests, Errors, Correlation techniques.

Attention is called to a very general unconditional model for representing the observed outcomes resulting from use of some experimental designs in analysis of variance. Included as special cases are factorial, randomized block, and split-plot designs. The model is of a fixed-effects nature and the interest is in investigating the effects of treatments. The outcomes are allowed to be dependent in an almost arbitrary fashion and each outcome can have a substantially different distribution. In particular, the outcomes can be correlated almost arbitrarily and can have appreciably different variances. In spite of this generality, the sum of squares for error, the sum of squares for treatments, and estimates of contrasts (comparisons) in treatment effects possess the properties that would occur if the observations were independent and the random error terms had the same distribution. This model may help explain why the usual estimates and tests for treatment effects in factorial, randomized block, split-plot, and other designs have been applied so successfully. These estimates and tests are known to be approximately applicable for a broad class of situations when the error terms constitute a random sample. (Author)

AD-617 773 Div. 15/1
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
STOCHASTIC DUELS WITH HOMING,
by Trevor Williams. 18 May 65, 35p
Rept. no. SP-1017/106/00
Unclassified report

Descriptors: (*Game theory, Stochastic processes), (*Stochastic processes, Game theory), Probability, Kill probabilities.

Duels where both marksmen 'home' or 'zero in' on one another are here considered, and the effect of this on the win probability is determined. It is proved generally that if the over-all hit probability is fairly and naturally defined, the only possible result of homing must be to worsen a duelist's performance. Next it is shown that a negative binomial distribution of conditional hit probability over rounds exhibits the effect of homing and leads to win probabilities that can be straightforwardly evaluated. Maximum-likelihood estimation of the hit probability and homing from field data is outlined. The solutions of the duels are displayed as contour maps. (Author)

AD-617 786 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
REPRESENTATIONS AND PRODUCTS OF TRANSITION GRAPHS.
Scientific rept.,
by Michael Yoeli and Clarence M. Ablow. 1 Jun 65, 24p Rept. no. SR-1
Contract AF19 628 5092, Proj. 4641, Task 464101
AFCRL 65-400
Unclassified report

Descriptors: (*Algebraic topology, Graphics), (*Graphics, Algebraic topology), Transformations-(Mathematics), Theorems, Conformal mapping.

A concise algebraic representation of isomorphism classes of directed graphs with no more than one edge issuing from a vertex is applied to find convenient formulas for the Cartesian products of such graphs. (Author)

AD-617 799 Div. 15/1, 25/5

Texas Univ., Austin. Dept. of Mathematics.
ROTATIONS AND LORENTZ TRANSFORMATIONS,
by Peter Rastall. 2 Feb 64, 18p
Contract AF33 651 1029; Grant AF AFOSR454 63,
Proj. 9749, Task 974901
AFOSR 65-1018
Unclassified report

Pub. in Nuclear Physics v57 n1 p191-207 1964
(Copies available only to DDC users).

Descriptors: (*Rotation, Transformations(Mathematics)), (*Transformations(Mathematics), Matrix algebra), (*Relativity theory, Transformations-(Mathematics)), Groups(Mathematics), Complex variables, Vector analysis.

Any complex three-dimensional rotation is determined by a complex vector and by a complex angle of rotation. New, short proofs are given of the homomorphisms between the three-dimensional complex rotation group, the group of unimodular quaternions (or unimodular 2 X 2 matrices) and the restricted Lorentz group. A correspondence is established between certain complex three-dimensional rotation vectors and two-dimensional subspaces of Lorentz vectors. The two-dimensional subspaces which are invariant under a given restricted Lorentz transformation are shown to be determined by those eigenvectors of the corresponding three-dimensional rotation matrix which belong to real eigenvalues. For non-null restricted Lorentz transformations this leads to a proof of Synge's theorem. (Author)

AD-617 808 Div. 15/2

Purdue Univ., Lafayette, Inc.
HIGHER-ORDER PROPERTIES OF A STATIONARY POINT PROCESS,
Revised ed.,
by J. A. McFadden and Walter Weissblum. Mar 63, 20p
Unclassified report

Pub. in The Journal of the Royal Statistical Society Series B (Methodological) v25 n2 p413-31 1963 (Copies available only to DDC users).
Revision of manuscript submitted Feb 63.

Descriptors: (*Statistical processes, Theory), Statistical functions, Integral transforms, Probability.

This paper is concerned with joint distributions, joint moments, and joint renewal functions in a stationary point process. The random variables considered are (a) the numbers of events in adjacent intervals of given lengths, located either arbitrarily in time or by an arbitrary event, and (b) the lengths of intervals measured to the various events, beginning either at an arbitrary point or at an arbitrary event. The different bivariate probability functions are related to each other by means of transforms. Moments are considered. In particular, the marginal moments of the number of events, counted by either method, are related to transforms of the multivariate renewal functions. Each product moment of the interval lengths is expressed as a multiple integral of the joint probability of certain numbers of events. A new theorem is proved, more general than in a previous paper, concerning the superposition of two independent stationary point processes. This theorem gives conditions under which the successive intervals between events can be independent in each of the constituent processes and also in the merged process. (Author)

AD-617 854 Div. 15/1

Institute for Advanced Study, Princeton, N. J.
THE ELIMINATION OF CRITICAL POINTS OF A NON-DEGENERATE FUNCTION ON A DIFFERENTIABLE MANIFOLD,
by Marston Morse. 26 May 64, 65p
Grant AF AFOSR63 357, Proj. 9749, Task 974902
AFOSR 65-1040
Unclassified report

Pub. in Journal d'Analyse Mathematique (Israel) v13 p257-316 1964 (Copies available only to DDC users).

Descriptors: (*Functions, Algebraic topology), (*Algebraic topology, Functions), Differential equations, Theory, Topology.

M is a compact, connected, orientable, differentiable n-manifold of class C, and f is a non-degenerate function of class C. This note reveals certain fundamental topological characteristics of M by combining the study of the critical points of f with the study of certain differentiable submanifolds of M associated with the respective critical points of f and termed bowls of f. An attempt is made to modify f so as to eliminate as many critical points as possible, replacing f by another non-degenerate function. This is accomplished mainly through the development of a theorem concerning bowls and the existence of a non-degenerate function without critical points in a given neighborhood. (Author)

AD-617 856 Div. 15/1

California Univ., Los Angeles.
ON SUITABLE MANIFOLDS,
by Robert F. Brown. 30 Dec 63, 8p
Grant AF AFOSR90 63, Proj. 9749, Task 974902
AFOSR 65-1039
Unclassified report

Pub. in Mathematica Scandinavica v14 p174-8 1964 (Copies available only to DDC users).

Descriptors: (*Algebraic topology, Theory), Functions, Differential equations, Topology.

M is a manifold and G(M) denotes the group of all homeomorphisms of M onto itself with the compact-open topology. For a point e belonging to M, M is suitable if there exists a continuous map T: M approaching G(M) such that T (x)(x)=e and T (e) = identity. This note shows that when M is compact, suitability is equivalent to the existence on M of a continuous multiplication which has many of the properties of a group multiplication. A definition is also given of suitability for differentiable manifolds with a proof that such manifolds are parallelizable. (Author)

AD-617 857 Div. 15/1

Carnegie Inst. of Tech., Pittsburgh, Pa.
CHRYSTAL'S THEOREM ON DIFFERENTIAL EQUATION SYSTEMS,
by R. J. Duffin. 1964, 7p
Grant DA AROD31 124G78
AROD 223:61
Unclassified report

Pub. in Journal of Mathematical Analysis and Applications v8 n2 p325-331 Apr 1964 (Copies available only to DDC users).

Descriptors: (*Differential equations, Theorems), (*Theorems, Differential equations), Matrix algebra, Real variables, Complex variables, Difference equations, Polynomials.

AD-617 858 Div. 15/1

Carnegie Inst. of Tech., Pittsburgh, Pa.
DISCRETE ANALYTIC CONTINUATION OF SOLUTIONS OF DIFFERENCE EQUATIONS,
by R. J. Duffin and C. S. Duris. 1964, 16p
Grant DA ARO D31 124G78
AROD 223:62
Unclassified report

Pub. in Journal of Mathematical Analysis and Application v9 n2 p252-67 Oct 1964 (Copies available only to DDC users).

Descriptors: (*Difference equations, Functions), (*Functions, Difference equations), Complex variables, Matrix algebra.

AD-617 862 Div. 15/1, 25/6

Technion - Israel Inst. of Tech., Haifa.
A UNIFIED EQUATION OF MOTION IN THE NON-RELATIVISTIC MECHANICS,
by Z. Karni. 1963, 8p
Grant AF EOAR63 72
AFOSR 65-1025

Unclassified report

Pub. in Israel Journal of Technology v2 n3 p287-94 1964 (Copies available only to DDC users).

Descriptors: (*Differential equations, Mechanics), (*Mechanics, Differential equations), Field theory, Continuum mechanics, Tensor analysis, Moments, Force(Mechanics).

An equation, describing the motion of the continua, as well as of the particle and the rigid body, in terms of the tensor derivative of physical tensors, the space-time derivative and the first and second curvature tensors, is presented. (Author)

AD-617 864 Div. 15/1

Harvard Univ., Cambridge, Mass.
LINEAR INVARIANT FAMILIES OF ANALYTIC FUNCTIONS, PART II (Linear-Invariante Familien Analytischer Funktionen II),
by Christian Pommerenke. 25 Jun 63, 38p
Grant AF AFOSR62 198, Proj. 9749, Task 974902
AFOSR 65-1038

Unclassified report

Text in German with attached summary in English, pub. in Mathematische Annalen v156 p226-62 1964 (Copies available only to DDC users).

Descriptors: (*Functions, Invariance), Geometry, Theory.

This paper considers normal families M of functions that are analytic, locally univalent, and normalized in the unit disk. These families are assumed to satisfy a certain invariance property. The prime example is the family U of normalized univalent functions. Another example is the family of locally univalent p-valent functions. In the first part, general properties of these families are studied. For instance, the distortion theorems for U can be generalized to the families M. If the family M is of uniformly bounded characteristic (as is U) then a number of geometric properties can be established, several of which are new even for the case U. In the second part, the boundary behavior of functions in M is investigated, using a certain sequence of functions again in M. Several types of boundary behavior are described and studied. (Author)

AD-617 874 Div. 15/1

Army Electronics Labs., Fort Monmouth, N. J.
ON SYSTEMS OF LINEAR DIFFERENTIAL EQUATIONS WITH PERIODIC COEFFICIENTS: ALGEBRAIC AND TOPOLOGICAL ASPECTS,
by Irving J. Epstein. 1962, 17p

Unclassified report

Pub. in Journal of Differential Equations v1 n2 p206-21 Apr 1965
(Copies available only to DDC users).

Descriptors: (*Differential equations, Matrix algebra), (*Matrix algebra, Differential equations), Topology, Algebras.

AD-617 894 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.
A DUEL WITH SILENT NOISY GUN VERSUS NOISY GUN.
Technical rept.,
by Gerald Smith. Jun 65, 23p
Contract Nonr22288, Proj. NR041 255

Unclassified report

Descriptors: (*Game theory, Optimization), Probability, Guns, Noise.

A two person duel where the first person has one silent and one noisy shot to be fired in that order and the second person has one noisy shot is analized for arbitrary continuously increasing, as the distance between duelists decreases, accuracy functions. The value of the duel and optimal strategies are computed. (Author)

AD-617 909 Div. 15/1
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON A NEW APPROACH TO THE NUMERICAL SOLUTION OF A CLASS OF PARTIAL DIFFERENTIAL INTEGRAL EQUATIONS OF TRANSPORT THEORY,
by Richard Bellman and Robert Kalaba. Jul 65,
16p Memo. no. RM-4667-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Partial differential equations, Integration), (*Integral equations, Numerical analysis), Transport properties, Spheres, Numerical methods and procedures, Differential equations.

This Memorandum shows how to approximate a nonlinear partial differential integral equation by a system of ordinary differential equations. A table of necessary constants is provided, and the results of a test calculation on an equation of radiative transfer in a spherical shell are described. (Author)

13. Mechanical, Industrial, Civil, and Marine Engineering

AD-617 246 Div. 13/4, 14/6
CFSTI Prices: HC$3.00 MF$0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
PLASTIC HINGE FORMATION IN REINFORCED CONCRETE BEAMS.
Technical rept. for 1 Aug 63-31 Dec 64,
by William J. Nordell. Jun 65, 80p
Rept. no. TR-R-371
Proj. Y F011 05 04 001

Unclassified report

Descriptors: (*Reinforced concrete, Beams(Structural)), (*Beams(Structural), Reinforced concrete), (*Flexible structure, Reinforced concrete), (*Plasticity, Reinforced concrete), Deformation, Dynamics, Loading-(Mechanics), Statics, Compressive properties, Deflection, Moments, Stresses, Strain(Mechanics), Civil engineering.

Fifteen static and dynamic tests were conducted to measure the actual magnitude of the curvature of a plastic hinge and to correlate the angle of deformation with resistance for beams subjected to dynamic loads. The primary variables were the amount of compression reinforcement, the distance between the concentrated loads, and the rate of loading. The dynamic step loads ranged in magnitude from about 1.10 to 1.25 times the static yield load. The computed values of moment, curvature, and deflection at the onset of plastic hinging were less than the experimental values for both static and dynamic loadings. The 30% increase in beam resistance under dynamic loads agreed with the increase in yield strength of the coupon specimens subjected to rapid straining. Plastic hinging was similar in the static and dynamic beams loaded at mid-span. Crushing occurred at approximately the same deflection under both types of load. For the beams with a pure moment region, a dynamic load equal to approximately 1.1 times the static load caused crushing at mid-span before the plastic hinge had developed as completely as it did for static loading; thus, for dynamic loads, the deflections were lower at the onset of crushing than they were for static loads. (Author)

AD-617 290 Div. 13/4, 13/3
CFSTI Prices: HC$4.00 MF$1.00

Pittsburgh Univ., Pa.
ENGINEERING BEHAVIOR OF A WASTE CONVERSION END PRODUCT.
Master's thesis,
by Donald Matthew de Blonk. 1965, 120p

Unclassified report

Descriptors: (*Wastes(Sanitary engineering), Disposal), (*Structural properties, Wastes(Sanitary engineering)), (*Materials, Civil engineering), Sanitary engineering, Foundations(Structures), Earth, Soil mechanics, Compressive properties, Stresses, Density, Trafficability, Stability.

The laboratory investigation reported is concerned with the engineering behavior of the compost material in a compacted fill obtained from processing waste products and sewage. From the information obtained in the laboratory, it is possible to recommend 1) the best method of placement, 2) the allowable bearing capacity, 3) the slope stability, and, 4) the expected settlement of the material placed in a landfill. (Author)

AD-617 322 Div. 26/6, 14/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINING WEAR RESISTANCE OF FRICTION COUPLINGS BY THE METHOD OF CONSUMING WORKING MEDIUM THROUGH THE SLOTS BETWEEN THE FRICTION SURFACES,
by F. Ya. Zagavura. 18 May 65, 9p
FTD-TT-65-69
TT 65-62550

Unclassified report

Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Dopovidi n5 p603-6 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Wear resistance, Couplings), (*Friction, Wear resistance), Machines, Air, Gases, Lubricants, Oils, Surfaces, USSR.

A new method is considered for estimating the wear-resistance of material by determining the expenditure. The method is based on determination of the variation in the initial expenditure of working substance through gaps between rubbing surfaces in the process of wear. The working substance may be air, various gases, lubricating oils and other fluids. (Author)

AD-617 337 Div. 31/4
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
INELASTIC BUCKLING TESTS OF RING-STIFFENED CYLINDERS UNDER HYDROSTATIC PRESSURE.
Final rept.,
by Lance Bolchot and Thomas E. Reynolds.
May 65, 42p Rept. no. 1992
Proj. S F013 03 02, Task 1951

Unclassified report

Descriptors: (*Submarine hulls, Model tests), (*Stiffened cylinders, Buckling(Mechanics)), (*Hydrostatic pressure, Cylindrical bodies), Rings, Hardening, Strain(Mechanics), Stability, Tensile properties, Stresses.

A series of small machined aluminum models were collapsed under external hydrostatic pressure to study the inelastic buckling of near-perfect ring-stiffened cylinders made of strain-hardening materials. The predominant modes of failure were general instability and axisymmetric shell buckling. Comparisons of test results with the analyses of Lunchick, Krenzke, and Kiernan show promising correlation but additional data would be needed for a complete evaluation. High bending stresses near frames did not noticeably affect axisymmetric shell buckling strength. The presence of frame fillets, however, caused a significant increase in general instability strength although bending stresses in the absence of fillets were relatively low. (Author)

AD-617 340 Div. 13/3, 13/4

Bureau of Reclamation, Denver, Colo.
FOSS AQUEDUCT: TECHNICAL RECORD OF DESIGN AND CONSTRUCTION.
Mar 65, 250p

Unclassified report

Available from Bureau of Reclamation, Attention: Code 841, Denver Federal Center, Denver, Colorado 80225, HC$3.40.

Available from CFSTI, MF$1.50.
Report on Washita Basin Project, Oklahoma, constructed 1960-1962.

Descriptors: (*Water supplies, Pipes), (*Dams, Construction), History, Geology, Design, Costs, Pumps, Storage tanks, Flowmeters, Ventillation, Valves, Hydraulic systems, Concrete, Cements, Asbestos, Electrical equipment, Telemeter systems, Mechanical drawings, Specifications.

The technical record of design and construction for Foss Aqueduct is divided into three parts. Part I is devoted to general planning, historical information, a description of the features, a summary of costs, and geology. In part II there are four chapters covering the design of the various features and their components. Part III contains one chapter on contract administration and one chapter comprising a concise narration of construction operations and equipment installation.

AD-617 364 Div. 31/4, 25/6
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
INVESTIGATION OF THE STRENGTH-WEIGHT CHARACTERISTICS OF CYLINDRICAL SANDWICH-TYPE PRESSURE HULL STRUCTURES,
by William F. Blumenberg, Kenneth Hom, and John G. Pulos. May 1965, 46p Rept. no. 1678
Projs. SF013 03 02, SF013 01 03, Task 0214
Unclassified report

Descriptors: (*Sandwich construction, Submarine hulls), (*Submarine hulls, Sandwich construction), (*Cylindrical bodies, Sandwich construction), (*Structural shells, Sandwich construction), Stiffened cylinders, Welds, Steel, Model tests, Hydrostatic pressure, Stresses, Reinforcing materials, Rings, Structural properties, Failure(Mechanics).

Seven structural models fabricated (welded construction) of nominal 100,000-psi yield steel were designed and tested to collapse under external hydrostatic pressure to investigate the strength-weight characteristics of cylindrical sandwich pressure hulls. Four of these models were comprised of two concentric cylindrical shells with a core of annular web-type stiffeners, two others had toroidal tube-type stiffening elements, and the core of the seventh model consisted of straight tube elements oriented in the longitudinal direction. The results of this series of hydrostatic tests indicate that in certain ranges and subject to certain restrictions on geometry, sandwich-type cylindrical pressure hulls may possess structural efficiencies on the order of 10 to 20 percent higher than those for conventional ring-stiffened constructions. The sandwich concept provides a practical and efficient means for fabricating the thick walls required in vehicles for deep-depth operation. (Author)

AD-617 405 Div. 13/4
CFSTI Prices: HC$4.00 MF$0.75

Illinois Univ., Urbana. Dept. of Civil Engineering.
INTERACTION OF PLANE ELASTIC WAVES WITH A THICK CYLINDRICAL SHELL.
Final rept. for Dec 62-Mar 65,
by S. Paul, A. Robinson, and M. Ali-Akbarian.
Jun 65, 109p
Contract AF29 601 5007, Proj. 5710, Task 13 14 8
WL TR-65-31
Unclassified report

Descriptors: (*Stresses, Underground structures), (*Underground structures, Stresses), Mechanical waves, Cylindrical bodies, Potential theory, Fourier analysis, Series, Boundary value problems.

A method is presented for computing stresses in the vicinity of a lined cylindrical cavity in an infinite, elastic, isotropic, homogeneous medium as it is enveloped by a plane stress wave of dilatation traveling in a direction perpendicular to the axis of the cavity. The liner, which may be thick, is considered as a second elastic medium. Both the incident stress and the perturbations in the stress field are represented by Fourier series where the coefficients are functions of radius and time. These coefficients represent two dimensional traveling-wave solutions and are found by solving sets of coupled integral equations of the Volterra type. A computer program was written to carry out the numerical computations. Hoop stresses in the liner and in the medium at the liner-medium interface were computed at various angles around the opening for a plane longitudinal step wave. It was found that the maximum dynamic stresses occur on a diameter which is perpendicular to the direction of wave propagation, and that the dynamic stresses are sensitive to variation of the ratio of thickness of the liner to its radius, and stiffness of the liner relative to that of the medium. Further studies were then made to determine the variation of maximum hoop stresses in the liner and medium with these parameters. The maximum dynamic stresses were compared with the corresponding static values. In addition, the effect of decay and rise time of the incident on the maximum hoop stress was investigated. (Author)

AD-617 408 Div. 13/4, 30/4
CFSTI Prices: HC$3.00 MF$0.75

Arizona State Univ., Tempe. School of Engineering.
AN INVESTIGATION OF THE EFFECTS OF DYNAMIC LOADS ON THE SHEAR STRENGTH OF SOILS.
Master's thesis,
by George W. Barnes. Jan 65, 82p
Contract AF33 608 1039
Unclassified report

Descriptors: (*Soil mechanics, Shear stresses), (*Shear stresses, Soil mechanics), (*Loading(Mechanics), Soil mechanics), Dynamics, Compressive properties, Soils, Foundations(Structures), Engineering geology, Test methods, Test equipment.

Soils supporting the foundations of structures subjected to vibrating loads often exhibit strength and elastic properties which are considerably different from the properties of the same soil under static conditions. The purpose of this investigation was to develop an apparatus which could be used for laboratory investigations of the effects of dynamic stress conditions on the shear strength of a soil. An attempt was also made to determine the effects of static shear stresses, confining pressure, and the amplitude of vibration on the velocity of stress wave propagation in a soil sample.

AD-617 411 Div. 13/4
CFSTI Prices: HC$3.00 MF$0.75

Texas Univ., Austin.
BEHAVIOR OF CONTINUOUS COMPOSITE MEMBERS UTILIZING PRECAST-PRESTRESSED CONCRETE RODS AS REINFORCEMENT.
Master's thesis,
by Frank L. Hines. May 65, 91p
Contract AF33 608 1121
Unclassified report

Research supported in part by National Science Foundation, Washington, D. C.

Descriptors: (*Reinforced concrete, Beams(Structural)),

(*Beams(Structural), Reinforced concrete), Cantilever beams, Reinforcing materials, Rods, Loading(Mechanics), Fracture(Mechanics), Stresses, Deformation, Structures, Castings.

An experimental and analytical investigation was made concerning the improvement of continuous prestressed concrete structures. The type of members selected for study were a double cantilever specimen and a multiple span girder. Of prime importance in this investigation were the effectiveness and practicality of using precast-prestressed concrete reinforcing rods to develop the continuity bending moment at the section where precast-prestressed elements were joined. For both of the specimens tested in this study, two precast beams were made continuous for negative moment at an interior support.

AD-617 415 Div. 26/6
CFSTI Prices: HC$3.00 MF$0.75

Columbia Univ., New York. School of Engineering and Applied Science.
EQUILIBRIUM CHARACTERISTICS OF AXIAL GROOVE GAS LUBRICATED BEARINGS.
Lubrication research lab. rept.,
by V. Castelli and J. Pirvics. 1965, 72p
Rept. no. LRL-1
Contract Nonr26688, Proj. NR062298
Unclassified report

Descriptors: (*Gas bearings, Stability), (*Journal bearings, Stability), Friction, Loading(Mechanics), Design, Pressure, Geometry, Partial differential equations, Lubrication, Incompressible flow, Turbulence, Films, Tables, Graphics.

The report contains the description of a new general method for the solution of Reynold's equation for compressible and incompressible lubrication. A great improvement in numerical stability and speed of convergence is derived for all fluid film geometries including converging-diverging ones. The method is used for the determination of load coefficients and attitude angles of three- and four-pad axial groove cylindrical bearings. (Author)

AD-617 441 Div. 26/1, 25/7

Air Force Avionics Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
LOW-ENERGY SPUTTERING YIELDS BY RESONANCE ABSORPTION AND EMISSION SPECTROSCOPIC METHODS.
Technical rept.,
by W. C. Kreye. 19 Mar 64, 8p
Rept. no. AL-TR-65-118
Proj. 4152
Unclassified report

Pub. in Journal of Applied Physics v35 n12 p3575-82 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sputtering, Spectroscopy), Gold, Single crystals, Resonance absorption, Absorption spectrum, Atomic spectroscopy, Metal coatings, Atomic properties.

Low-energy sputtering yields for a (110)-oriented gold single crystal are determined by means of a resonance or atomic absorption technique wherein the sputtered atoms absorb the resonance radiation from an external gold, hollow cathode source. If the square root of the relative yield is plotted vs target voltage, a linear portion is found between 40 and 70 V. The extrapolation of the linear portion of the curves gives rise to an average intercept energy E sub E of 29 eV at low pressures. The discharge chamber is specially designed to permit consecutive measurements of the sputtering yields by the absorption and by a previously employed emission technique under identical chamber geometry and discharge conditions. In the direct comparison of results possible thereby, the average value of E sub E from the emission curves is 29.5 eV which is approximately equal to the above absorption value of 29 eV. The plasma potential for these experiments is found to be about 12 eV. Moreover, the curves themselves are proportional over the range of 40 to 100 V. These results strongly indicate that E sub E is an experimental invariant from which reliable threshold energies can be obtained. This coincidence of curves also indicates that the variation of excitation probability of the Au atoms with different ion and correspondingly different atom energies does not affect the emission yield curves. The sensitivity of the absorption method with the present hollow cathode is slightly poorer than that of the emission method. (Author)

AD-617 483 Div. 13/4

Royal Military Coll. of Canada, Kingston (Ontario).
ULTIMATE CAPACITY OF STEEL COLUMNS LOADED BIAXIALLY,
by J. S. Ellis, E. J. Jury, and D. W. Kirk.
1964, 10p Rept. nos. EIC-64-BR, STR 2
Unclassified report

Pub. in Transactions of the Engineering Institute of Canada v7 nA2 p3-11 Feb 1964 (Copies available only to DDC users).

Descriptors: (*Beams(Structural), Loading(Mechanics)), (*Steel, Beams(Structural)), Tensile properties, Failure-(Mechanics), Canada, Deformation, Geometric forms, Elasticity, Stresses, Canada.

The problem was to theoretically predict the ultimate capacity of columns loaded biaxially, i.e., columns subjected to an axial load plus terminal bending moments about two principal axes of the cross-section. The material was mild steel and the cross-section was a hollow, square, thin-sided box. The plastic theory with its failure criterion of overlapping shapes was used.

AD-617 526 Div. 26/1, 17/6
CFSTI Prices: HC$1.00 MF$0.50

Watertown Arsenal, Mass.
HEAT-TREAT AGING PRACTICE FOR SHELL MOLD CAST 356 ALUMINUM,
by Emil Toledo and Bryant Crocker. Feb 65, 21p
Unclassified report

Descriptors: (*Aluminum alloys, Heat treatment), (*Aging(Materials), Aluminum alloys), (*Castings, Aluminum alloys), Microstructure, Casting alloys, Temperature, Mechanical properties.

Use of acceptable aging treatments on the basis of processing and chemistry permits attainment of near optimum physical properties for aluminum shell castings. Data developed on aging times for one aluminum casting alloy or one casting process are not always applicable to another aluminum casting alloy or process. A wide range of aging times and temperatures will produce near optimum properties for 356 aluminum with less than .30% iron. However, the acceptable aging cycle, time and temperature ranges narrow rapidly for iron contents of over .40%. (Author)

AD-617 533 Div. 13/3
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.

SURVEY OF ANTARCTIC WATER SUPPLY AND WASTE DISPOSAL FACILITIES, PRACTICES, AND PROBLEMS.
Technical note for Jan-Mar 65,
by Neil L. Drobny. Apr 65, 38p Rept. no. TN-N-708
Proj. Y F015 11 01 105
Unclassified report

Descriptors: (*Polar regions, Water supplies), (*Water supplies, Polar regions), (*Wastes(Sanitary engineering), Disposal), Logistics, Construction, Maintenance, Civil engineering, Design, Operation, Sewage, Bags(Containers), Toilet facilities.

Low temperature conditions initiate physical, biological, and chemical changes in the environment. These, in turn, pose significant problems in the design, construction, and operation of facilities for the distribution of water and for the collection, treatment, and disposal of waste. In addition, remoteness is a sizeable problem in the South Polar Region. Distance greatly slows the rate at which material can be supplied for the purposes of construction, maintenance, and repair. As a result, logistics problems assume unusually significant proportions. The need for simple systems is paramount. A survey of water supply and waste disposal problems at existing United States stations in the Antarctic is presented. Problem areas are identified, and potential research and development efforts are suggested. (Author)

AD-617 558 Div. 26/4, 15/2
CFSTI Prices: HC$1.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa.
ESTIMATION OF SIGMA USING AVERAGE RANGE FROM k RANGES OF VARYING SIZES.
Technical note,
by William Granville, Jr. Jun 65, 11p
Rept. no. TN-1115
Proj. 5B9701006
Unclassified report

Descriptors: (*Quality control, Analysis of variance), (*Analysis of variance, Quality control), Statistical distributions, Errors, Population(Mathematics).

An efficient way was determined to estimate the population standard deviation using k ranges of varying sizes. Standard deviation has been estimated using k ranges of equal size, but the investigator has yet to see the development for the above case. The investigation relies on estimation of standard deviation, using the overall range and the biasness encountered therein. These results may be used to estimate standard deviation when one has subgroups of different sizes belonging to a sample of size N. (Author)

AD-617 605 Div. 31/5, 17/4, 17/5
CFSTI Prices: HC$6.00 MF$1.25

LVT Vought Aeronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
HYDROFOIL MATERIALS RESEARCH PROGRAM.
Final engineering rept. for 21 Mar 61-1 Jul 65,
by A. E. Hohman, W. L. Kennedy, and T. P. Bellinger.
1 Jul 65, 205p Rept. no. ER-2-53100/5R-2179
Contract NObs84593, Proj. SF0130201, Task 1705
Unclassified report

Descriptors: (*Hydrofoils, Materials), (*Steel, Hydrofoils), (*Titanium alloys, Hydrofoils), Stresses, Corrosion, Erosion, Environmental tests, Rubber coatings, Synthetic rubber, Mechanical properties, Material forming, Protective treatments, Coatings, Welding, Machining, Castings, Laminated plastics, Corrosion-resistant alloys, Nickel alloys, Copper alloys, Cladding.

Sixty materials were studied to determine their suitability for use in construction of high performance hydrofoils and struts. Of these, seventeen materials were given screening tests for susceptibility to sea water corrosion and impingement erosion, and for comparisons of mechanical and fabrication properties. From this work HY-130 low alloy steel and Ti 7Al-2Cb-1Ta titanium were selected for development of design and fabrication data. The HY 130 suitably protected from the sea water environment with a neoprene coating is available for use. The titanium alloy shows many advantages but must have alloy changes to preclude stress corrosion cracking before economic benefits can be realized. (Author)

AD-617 614 Div. 13/4, 22/6
CFSTI Prices: HC$5.00 MF$1.25

Ammann and Whitney, New York.
SUPPORTING STUDIES TO ESTABLISH SAFETY DESIGN CRITERIA FOR STORAGE AND PROCESSING OF EXPLOSIVE MATERIALS.
Interim rept. no. 1,
by E. Cohen and N. Dobbs. Jun 65, 183p
Contract DA28 017AMC423A
PA TM-C-1
Unclassified report

Also includes Summary of One-Third Scale Reinforced Concrete Slab Tests.

Descriptors: (*Explosive materials, Storage), (*Reinforced concrete, Explosion effects), (*Explosion effects, Reinforced concrete), Safety, Structures, Tests, Loading(Mechanics), Failure(Mechanics), Fragmentation, Photographic analysis, Photographic techniques, Stresses.

Picatinny Arsenal is presently engaged in an extensive systematic testing program which has as its ultimate objective the establishment of design standards for use in engineering of new explosive storage facilities as well as in the modification of existing facilities. Presented are the results of 40 explosive tests of one-third scale reinforced concrete slabs. The major portion of these tests was conducted under a program entitled Support Studies to Establish Safety Design Criteria for Storage and Processing of Explosive Materials. (Author)

AD-617 617 Div. 13/4, 2/5
CFSTI Prices: HC$1.00 MF$0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
PENETRATION OF PLATES IN DENSE SNOW.
Research rept.,
by Malcolm Mellor and Rene O. Ramseier. May 65,
21p Rept. no. RR-151
Proj. 1V025001A130, Task 1V014501B52A31
Unclassified report

Descriptors: (*Snow, Foundations(Structures)), (*Foundations(Structures), Snow), Mechanical properties, Scientific research, Theory, Mathematical analysis, Viscoelasticity, Elasticity, Metal plates, Penetration, Deformation, Loading(Mechanics), Stresses, Shear stresses, Structural analysis, Strength, Polar regions.

As part of a program of snow studies in Greenland, instrumented struts were placed in rooms excavated below the surface of the ice cap. Closure rates were measured in the undersnow cavities, and strut loads developed by snow pressure on the circular end plates

were recorded. The strut installations are described and the data are interpreted in terms of Kerr's viscous foundation theory. Emphasis is placed on the penetration of a circular rigid plate, the evaluation of the viscosity coefficients, comments on the values of the parameters for a given material, shear viscosity, and thickness in the Kerr model, and the effect of plate size on penetration rate. It is tentatively concluded that (1) until a suitable treatment for the viscoelastic continuum becomes available, the Kerr model offers a rational approach to problems of foundations in snow and to certain problems involving pressures on undersnow structures, (2) the viscosity coefficients of the model are not in themselves characteristic constants for a given snow, (3) as a consequence of (2), the viscosity coefficients may not be evaluated by comparing data for plates of widely differing sizes, and (4) if the thickness coefficient were found to be independent of plate size, as seems possible, it would become a valuable index for determining size effect. (Author)

AD-617 718 Div. 13/4
CFSTI Prices: HC$4.00 MF$1.00

Naval Civil Engineering Lab., Port Hueneme, Calif.
STATIC AND DYNAMIC BEHAVIOR OF FIXED-BASE PORTAL FRAMES.
Final technical rept. for May-Dec 61,
by Stanley K. Takahashi and Richard H. Chiu. Jun 65, 149p Rept. no. TR-R-337
Task Y F008 08 02 102
DASA 13.062
Unclassified report

Descriptors: (*Structural parts, Mechanical properties), Dynamics, Statics, Loading(Mechanics), Stresses, Steel, Tests, Mathematical analysis.

Four steel portal frames, 8 feet high and 12 feet long, fabricated from 10B17 rolled sections, were tested under uniformly distributed static and dynamic loads. The loads were applied to one column of each frame to simulate a horizontal, traveling blast wave. The frames were partially restrained at their bases. Maximum static and dynamic loads of 92,000 and 91,000 pounds, respectively, were applied over one column of each frame. The rise times of the dynamic loads were approximately 2 to 3 milliseconds, and the loads decayed exponentially to zero in about 1 second. An equivalent triangular load-time function was used for analysis. Multiple-mode and simplified methods of dynamic analysis were performed. The simplified analysis adequately described the maximum displacement; the multiple-mode analysis was found necessary to determine the locations of maximum moment; and either method quite accurately predicted the response of the frames. Good correlation was obtained between theoretical and experimental values. The dynamic response factor was approximately 2.13, which was slightly larger than the theoretical value of 2.00. (Author)

AD-617 735 Div. 26/6, 25/6
CFSTI Prices: HC$4.00 MF$1.00

SKF Industries, Inc., Philadelphia, Pa.
A BASIC STUDY OF THE SLIDING CONTACTS IN ROLLING BEARINGS.
Summary rept., proj. 1, 16 Apr 64-16 Apr 65.
16 Apr 65, 125p Rept. no. AL65L045
Contract NOw64 028c, Projs. 18 7, 19 1
Unclassified report

See also AD-615 128.

Descriptors: (*Roller bearings, Mechanics), (*Friction, Roller bearings), Motion, Loading(Mechanics), Tests, Dynamics, Statistical analyses, Surface properties.

This study is concerned with 'smearing' in Hertzian contacts made of hardened steel (as in ball and roller bearings), i.e. severe wear occurrences involving macroscopic metal transfer between the surfaces. Criteria are sought for the selection of material, design and operating conditions that prevent smearing.

AD-617 760 Div. 26/5, 26/1, 17/5, 17/4
CFSTI Prices: HC$2.00 MF$0.50

Ad Hoc Machine Tool Advisory Committee, Washington, D. C.
PROFILE MILLING REQUIREMENTS FOR THE HARD METALS 1965-1970.
May 65, 40p
Unclassified report

Rept. to the Dept. of the Air Force.

Descriptors: (*Machining, Hardness), (*Metals, Hardness), (*Milling machines, Metals), Machining, Steel, Titanium alloys, Refractory metals, Refractory metal alloys, Nickel alloys, Cobalt alloys, Economics, Machine tools, Airframes.

To meet increasingly stringent conditions of speed, temperature, strength and reduced weight designed into new supersonic aerospace vehicles, hard metals will be used more and more. As time goes on, they also will be specified for more conventional applications because of their reliability, long life and low maintenance cost. The switch to hard metals makes necessary the development and use of big, rugged, rigid, high-powered, machine tools capable of cutting these materials to very fine tolerances at slow speeds. A detailed investigation of the machining requirements and of the available production equipment to meet those requirements in the years 1965 through 1969 shows a serious deficiency in the kinds of machines capable of cutting these hard metals efficiently to the specified tolerances at the lowest possible cost. National security cannot always be bought by putting chief emphasis on economy. Sometimes, when a pioneering production operation is necessary, cost saving has to be secondary if the job is to be done efficiently and expeditiously. The long-range view should prevail. Such an investment will ultimately be returned many times over in terms of cost as well as more effective weapon systems.

AD-617 788 Div. 31/5, 1/5
CFSTI Prices: HC$3.00 MF$0.75

Battelle Memorial Inst., Columbus, Ohio.
ANALYTICAL STUDY OF AIRCRAFT ARRESTING GEAR CABLE DESIGN.
Final research rept.,
by P. T. Gibson and H. A. Cress. 28 May 65, 85p
Contract Now64046lf Unclassified report

Descriptors: (*Arresting gear, Cables(Mechanical)), (*Cables(Mechanical), Arresting gear), Cable assemblies, Dynamics, Loading(Mechanics), Stresses, Tensile properties, Impact shock, Mathematical analysis, Carrier landings, Design, Wear resistance, Shock resistance, Mechanical properties, Elasticity, Mechanical waves.

The objective of this investigation is to develop a comprehensive cable design theory which will provide a basis for improved design and construction of wire rope.

AD-617 900 Div. 26/1, 17/4
CFSTI Prices: HC$1.00 MF$0.50

Naval Applied Science Lab., Brooklyn, N. Y.

DEVELOPMENT OF WELDING PROCEDURES FOR THE FABRICATION OF THICK PLATE TITANIUM ALLOY.
Progress rept. no. 1,
19 Jul 63, 10p Rept. no. 6377-4
Projs. SF013 01 03, SR007 01 02, Tasks 0216, 0704
Unclassified report

Descriptors: (*Titanium alloys, Welding), (*Welding, Titanium alloys), Metal plates, Thickness, Welding rods, Welds, Submarine hulls, Controlled atmospheres, Hardness, Contamination, Air, Aluminum alloys, Vanadium alloys.

The results of this investigation indicates that mechanized out-of-chamber welding of thick plate titanium alloy in the flat position can be accomplished without undue difficulty, provided that care is exercised in the preparation of the plates for welding and in the control of the welding operation and that a trailing shield of suitable design is used in the operation. Additional work in out-of-chamber mechanized welding of thick plate titanium is required to establish appropriate welding conditions for specific alloys intended for use in submarine hull construction and to assess the properties of weldments produced with these alloys.

AD-617 901 Div. 26/1, 17/4
CFSTI Prices: HC$1.00 MF$0.50

Naval Applied Science Lab., Brooklyn, N. Y.
DEVELOPMENT OF TECHNIQUES FOR MANUAL FILLET WELDING ON THICK PLATE TITANIUM ALLOY.
Technical memo.
1963, 16p Rept. nos. 6377-4, TM-6
Projs. SF013 01 03, SR007 01 02, Tasks 0216, 0704
Unclassified report

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Descriptors: (*Titanium alloys, Welding), (*Welding, Titanium alloys), Metal plates, Thickness, Aluminum alloys, Vanadium alloys, Welds, Contamination, Hardness, Controlled atmospheres, Argon, Helium, Surface properties, Welding rods.

The results of this study indicate that techniques can be developed to produce uncontaminated double-beveled, fillet reinforced welded joints in thick plate alloy titanium using out-of-chamber, manual, all position shielded inert-gas, consumable electrode, short circuit welding processes. Further development of these welding techniques is necessary to minimize or eliminate the occurrence of lack of fusion and cold shutting defects in the weldments. It is believed that improved welder skill and an increase in inductance in the power supply may help to overcome these difficulties. (Author)

AD-617 902 Div. 26/1, 17/4
CFSTI Prices: HC$1.00 MF$0.50

Naval Applied Science Lab., Brooklyn, N. Y.
DEVELOPMENT OF WELDING TECHNIQUES FOR FABRICATING A THICK PLATE TITANIUM PRESSURE BOX.
Technical memo.
1964, 17p Rept. nos. 6377-4; TM-7
Projs. SF013 01 03, SR007 01 02, Tasks 0216, 0704
Unclassified report

Descriptors: (*Titanium alloys, Welding), (*Welding, Titanium alloys), (*Pressure vessels, Titanium alloys), Titanium, Metal plates, Thickness, Welds, Containers, Surface properties, Contamination, Tests, Hydrostatic pressure, Aluminum alloys, Vanadium alloys.

Suitable out-of-chamber, manual and semi-automatic welding techniques have been developed for the fabrication of a titanium alloy pressure box of the type required for low cycle fatigue studies at the Marine Engineering Laboratory. These techniques may also be used for fabricating complex structural elements of heavy plate titanium. (Author)

AD-617 904 Div. 26/2
CFSTI Prices: HC$2.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
SOME DEVELOPMENTS IN MANAGEMENT SCIENCE AND INFORMATION SYSTEMS WITH RESPECT TO MEASUREMENT IN ACCOUNTING.
Management sciences research rept.,
by Neil Churchill and Andrew Stedry. Mar 65, 42p
Rept. no. MSRR-42
Contract Nonr76024, Proj. NR047 048
Unclassified report

Descriptors: (*Management planning, Commerce), (*Management control systems, Commerce), Management engineering, Computers, Data processing systems, Money, Costs, Budgets, Logistics, Decision making, Reliability, Mathematical analysis.

Developing techniques in management science, behavioral science, and information systems are discussed in the context of accounting measurement. Data requirements for implementation of the new planning and control techniques are considered and compared with data furnished by accounting reports. Input data and aggregation in contemporary information systems are compared with recording and classification in conventional accounting systems. It is proposed that accounting measurement principles be developed for data in 'micro' units, much smaller than the transaction, which serve as data inputs in on-line real-time information systems. It is also proposed that accounting measurement principles be extended to include non-monetary units and, in particular, to evaluating the measurement procedures used in determining the 'macro' units, much larger than the transaction, which serve as inputs for planning and control techniques developed in the management and behavioral sciences. (Author)

AD-617 905 Div. 26/2
CFSTI Prices: HC$2.00 MF$0.50

Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
CURRENT APPROACHES TO SOLVING WORKLOAD SCHEDULING, PREDICTION, DISTRIBUTION, AND SMOOTHING PROBLEMS,
by Gerald L. Thompson. Apr 65, 32p
Contract Nonr76024, Proj. NR047 048
Unclassified report

Descriptors: (*Management planning, Decision making), (*Management control systems, Commerce), Management engineering, Operations research, Costs, Budgets, Scheduling, Mathematical analysis, Mathematical prediction, Department of Defense.

Conclusion: In any successful Management Science application at least the following steps must be carried out: (1) The problem must be identified and precisely characterized. (2) Data must be collected relevant to the problem. (3) A solution technique must be devised and tested with the actual data. Comparison with actual operations should be made. (4) A method for installing the solution into the operating situation must be devised and tested. (5) Before actual installation is attempted, a 'total systems' study should be

made in order to be certain that (a) a valid problem is being solved, (b) the solution of this problem will not create difficulties in other parts of the system, (c) the solution technique is acceptable to the operating personnel who will have to implement it. The implication is that an organization that wants to have such problems solved will have to have an Operations Research department capable of carrying out at least steps (1), (2) and (5). Steps (3) and (4) can be done either by an 'in-house' O R group or else by a consulting firm. (Author)

14. Methods and Equipment

AD-617 255 Div. 30/3, 25/4
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
THE COMPENSATION OF TWO-BEAM INTERFEROMETERS.
Instrumentation papers,
by W. H. Steel. Jun 65, 30p
Rept. nos. AFCRL-65-382; IP-66
Proj. 8603, Task 860301
Unclassified report

Descriptors: (*Interferometers, Beams(Electromagnetic)), Light, Polarization, Optical images, Wedges, Glass, Telescopes.

For a two-beam interferometer, the variations of intensity in the plane of observation are given by the modulation function, which is equal to the mutual coherence function for the radiation arriving by the two separate beams. When this function is expressed in its most general form, it is found to depend on the spatial and spectral distributions of the light from the source, on any differences in the optical paths followed by the two beams, and on the states of polarization of the two beams. Hence, an interferometer can be used to measure any one of these quantities provided its influence can be separated from that of any qualtities. This separation of effects is basic to the techniques of interferometry and leads to the idea of compensation: the design of an interferometer that is insensitive to one or more of the quantities listed above. Examples are given of the compensation of interferometers for the spatial and spectral properties of the source and also for the state of polarization of the light. (Author)

AD-617 284 Div. 30/4
CFSTI Prices: HC$3.00 MF$0.75

Oklahoma Univ., Norman.
THE DESIGN AND CALIBRATION OF A VERY LOW SPEED OPEN CIRCUIT WIND TUNNEL.
Master's thesis,
by Richard Allan Milburn. 1965, 90p
Unclassified report

Descriptors: (*Wind tunnels, Design), Subsonic flow, Calibration, Circuits, Damping, Honeycomb cores, Aerodynamic characteristics, Blowers.

To achieve very low velocities using the large pulley required closing the inlet vanes of the blower to a near-shut position. This caused a churning effect to take place in the blower housing, resulting in a pulse being set up in the tunnel. This pulse was the result of what might be called inlet air starvation and it caused the velocity variations mentioned above. Using the smaller pulley reduced the fan RPM and thus provided slower tunnel velocities at wider vane openings.

AD-617 304 Div. 30/3, 10/6
CFSTI Prices: HC$3.00 MF$0.75

Wyoming Univ., Laramie.
THE CONSTRUCTION AND OPERATION OF T-BURNER FACILITIES FOR THE STUDY OF OSCILLATORY COMBUSTION.
Master's thesis,
by Robert Joseph Croteau. May 65, 63p
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Laboratory furnaces, Combustion), (*Combustion, Solid rocket propellants), Oscillation, Costs, Operation, Test facilities.

An investigation was made of the use of a T-burner facility for the study of oscillatory combustion. Methods of operation and treatment of data are discussed in detail. Cost and construction factors, and a program for future experimentation is presented. The T-burner technique is shown to be a very effective and relatively inexpensive method for the study of oscillatory combustion. (Author)

AD-617 305 Div. 30/3
CFSTI Prices: HC$3.00 MF$0.75

Wyoming Univ., Laramie.
THERMOCOUPLE CALIBRATION IN A SUBSONIC AIR FLOW.
Master's thesis,
by Harry L. Matthew. May 65, 100p
Unclassified report

Descriptors: (*Thermocouples, Calibration), (*Subsonic flow, Temperature), Subsonic flow, Gas flow, Air, Test equipment, Temperature, Recording systems.

This investigation resulted in the construction of a testing device for the calibration of a variety of test thermocouple probes. From the testing of fourteen types of probes a determination was made of the most satisfactory design for thermocouples that are to be used for recording temperature in a subsonic air flow. (Author)

AD-617 323 Div. 30/5, 8/2, 26/8
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana.
DESCRIBING FUNCTION ANALYSIS FOR NONLINEAR SAMPLED-DATA CONTROL SYSTEMS.
Doctoral thesis,
by John Macolm MacCallum, Jr. 1965, 94p
AFIT TR-65-5 Unclassified report

Descriptors: (*Servomechanisms, Functional analysis), (*Functional analysis, Servomechanisms), (*Nonlinear systems, Control systems), (*Control systems, Nonlinear systems), Feedback, Sampling, Functions, Fourier analysis.

In this report a generalized approach is used in the development of describing functions for autonomous nonlinear sampled data (NLSD) systems. The principles and assumptions of describing function theory are examined and developed so that they are applicable to the nonlinear sampled data problem. The direct application of Fourier analysis to the signals involved in the system is made possible by location of the nonlinear element in front of the sampler. The basic assumption made is that the error signal entering the nonlinear element is a pure sinusoid.

AD-617 346 Div. 30/3, 32/3
CFSTI Prices: HC$2.00 MF$0.50

Transducer Information Center, Battelle Memorial Inst., Columbus, Ohio.
QUARTERLY ACCESSION LIST 9.
Rept. for 16 Apr-15 Jul 65.
15 Jul 65, 31p TIC accession list no. 9
Contract AF33 615 2532, Proj. 8222, Task 822203
Unclassified report

Descriptors: (*Transducers, Bibliographies),

(*Telemeter systems, Bibliographies), (*Control systems, Bibliographies), (*Servomechanisms, Bibliographies), Measuring devices(Electrical and electronic), Meters, Indexes, Abstracting, Information retrieval, Documentation.

The Transducer Information Center was established in limited form as a pilot type operation at Battelle Memorial Institute on April 15, 1963. It is part of a research program to determine the requirements for establishing a comprehensive and well-rounded source of information and data to serve designers of control and telemetry systems. The accession list covers the following areas: Acceleration, acoustics, attitude, bio-medical, displacement, flow, humidity, level, magnetic field, motion, position, pressure, shock, strain, strain gage, temperature, thickness, velocity, and vibration.

AD-617 369 Div. 30/3, 25/6, 25/4
CFSTI Prices: HC$2.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
RECENT INSTRUMENTATION FOR THE OPTICAL STUDIES OF SOLIDS IN THE VACUUM ULTRA-VIOLET,
by Paul L. Hartman. Jul 64, 28p
Unclassified report

Descriptors: (*Ultraviolet equipment, Solid state physics), (*Solid state physics, Vacuum), Optical equipment, Instrumentation, Lasers, Ultraviolet spectroscopy, Photoelectric effect.

Recent progress in vacuum ultra-violet instrumentation and techniques useful to solid state physics is described, although much of the instrumentation advances are also of use to other V-uv studies. Improvements in sources, detectors, and dispersive systems (particularly in grating reflectivities) are noted. While commercial instrumentation is not described, it is perhaps in this area that the most striking instrumental progress has come. Besides optical studies, work on internal and external photoemission continues to augment the optical work. Interest in luminescent systems is also still useful as indicating something about the energy band scheme in insulating solids. An important advance is noted wherein use is made of laser radiation in conjunction with ultra-violet radiation in a double photon absorption process in KI. (Author)

AD-617 382 Div. 30/4, 10/7
CFSTI Prices: HC$1.00 MF$0.50

Naval Ammunition Depot, Crane, Ind.
THE INVENTION OF A NEW TYPE OF FRICTION SENSITIVITY APPARATUS,
by Carl Armour and Lloyd Smith. 11 Jun 65, 24p
Rept. no. RDTR-60
Unclassified report

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Descriptors: (*Test equipment, Friction), (*Friction, Ignition), (*Ignition, Explosive materials), Pyrotechnics, Propellants, Rotation, Torque, Sensitivity, Measurement, Energy.

A new type of test apparatus was invented which obtains an absolute value in foot-pounds for the frictional energy required to ignite explosives, pyrotechnics, propellants and other high energy compositions. The device obtains the frictional energy of ignition by spinning a rod on the sample held in an alundum sample holder. This energy is calculated from the torque load, the deflection, the revolutions per minute and the time to fire. Reproducibility of test results using duplicate samples is within a 1% to 2% range. (Author)

AD-617 499 Div. 24/1

Suffield Experimental Station, Ralston (Alberta).
PNEUMATICALLY DRIVEN SHUTTER FOR HIGH-SPEED CAMERAS,
by J. C. Muirhead and F. L. McCallum. 8 Feb 61, 2p
Proj. D89 16 01 09
Unclassified report

Pub. in Journal of Scientific Instruments v38 p264-5 Jun 1961 (Copies available only to DDC users).

Descriptors: (*High-speed cameras, Camera shutters), (*Camera shutters, High-speed cameras), (*Pneumatic devices, Camera shutters), Shock tubes, Flow visualization, Camera controls.

AD-617 512 Div. 30/3, 25/8, 25/4

Poulter Research Labs., Stanford Research Inst., Menlo Park, Calif.
MEASUREMENT OF ENERGY FLUX DENSITY DISTRIBUTION IN THE FOCUS OF AN ARC IMAGE FURNACE,
by Rodney B. Beyer, Leonard McCulley, and Marjorie W. Evans. 13 Feb 63, 6p
Unclassified report

Pub. in Applied Optics v3 n1 p131-5 Jan 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Calorimeters, Design), (*Furnaces, Calorimeters), Measurement, Images, Energy, Distribution, Heat transfer, Thermal radiation, Theory, Thermodynamics, Density.

A calorimeter for mapping flux density in a focal volume is described. The design is based on an earlier design by Broido and Willoughby. It differs chiefly in two ways. First it is much smaller in order to permit its placement inside a test specimen chamber. Second the design provides for an aperture-containing shield which is placed in front of the receiving surface calorimeter in order to limit the area of beam which is intercepted. The decay constant is 0.002/sec. Flux densities ranging from 5 to 120 cal/sq cm-sec can be conveniently measured over intercepted beam areas of from 0.03 to 0.2 sq cm. With this calorimeter the flux-density distribution in the focal volume of a double ellipsoidal are image furnace system was determined. (Author)

AD-617 520 Div. 30/3, 8/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Radio Corp. of America, Camden, N. J.
OSCILLISTOR SENSING TECHNIQUES.
Final technical rept. for Jan 63-Sep 64,
by E. E. Moore. May 65, 83p
Contract AF33 657 10564, Proj. 4107, Task 410719
FDL TDR-64-150
Unclassified report

Descriptors: (*Crystal oscillators, Monitors), (*Semiconductor devices, Monitors), (*Molecular electronics, Crystal oscillators), Silicon, Germanium, Electric currents, Oscillation, Magnetic fields, Electric fields, Frequency, Theory, Manufacturing methods, Tests, Performance(Engineering), Wiring

diagrams, Design, Transducers, Voltage, Temperature, Motion.

The report describes the technical findings of an 18-month Research and Development effort to determine the feasibility of using the oscillistor, a molecular electronics device, to sense changes in voltage, temperature and angular position. Both germanium and silicon oscillistors were fabricated and evaluated for the sensing application. The theory of oscillistor operation was summarized and compared with actual device performance data. Test models were fabricated and delivered to the Flight Dynamics Laboratory. Silicon oscillistors were found to be the most stable. It is recommended that advances in silicon planar technology be applied to produce a silicon oscillistor with lower operating impedance. Such a device would make a practical low-dissipation sensor. (Author)

AD-617 532 Div. 30/4, 8/6
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Lab., Corona, Calif.
NOLC FACILITIES FOR VERY-LOW-FREQUENCY RESEARCH,
by R. H. Espeland. 14 Jun 65, 64p
Rept. no. NOLC-623
Proj. 4 004

Unclassified report

Descriptors: (*Test facilities, Very low frequency), (*Very low frequency, Naval research), Antennas, Atmospherics, Ordnance laboratories, Test equipment-(Electronics), Solar fares, Detection.

The history and development of the NOLC Lucerne Valley field site for VLF research is given, together with concise descriptions of its capabilities, equipment, and brief, unclassified reports on presently conducted projects. (Author)

AD-617 599 Div. 30/5, 30/2

Saskatchewan Univ. (Saskatoon).
THE APPLICATION OF A MODIFIED CONDITIONAL PROBABILITY COMPUTER TO CHEMICAL PROCESS OPTIMIZATION,
by E. B. Tinker and P. N. Nikiforuk. 3 Jun 63, 7p
Grants DRB2804 05, NRC A1819

Unclassified report

Pub. in Canadian Journal of Chemical Engineering v42 p126-31 Jun 1964.
(Copies available only to DDC users).

Descriptors: (*Optimization, Chemical reactions), (*Computers, Optimization), Pattern recognition, Cybernetics, Probability, Control systems.

The application of a conditional probability computer to the steady-state optimization of a simple chemical process has been investigated. On the basis of the work of previous investigators, the memory structure of the conditional probability computer was modified in a way designed to accelerate the learning process and improve the predictive capabilities of the computer. The proposed modifications were studied by optimizing an analog simulation of a simple chemcial process subjected to a variety of uncontrolled disturbances. The investigations served to delineate some of the special problems encountered in the application of a binary pattern recognition device such as the conditional probability computer to process optimization. The proposed modifications were successful in achieving significant acceleration in the learning process and improvement in predictive capabilities over that offered by a conventional conditional probability computer. (Author)

AD-617 643 Div. 30/3, 32/1

Australian Defence Scientific Service, Melbourne.
A MULTI-CHANNEL TREE STRAIN RECORDING SYSTEM.
1964, 4p

Unclassified report

Pub. in Electronic Engineering Nov 1964 (Copies available only to DDC users).

Descriptors: (*Strain gages, Multiplex), (*Multiplex, Strain gages), (*Trees, Strain gages), Explosion effects, Strain(Mechanics), Deformation, Measurement, Forestry.

This article describes a strain recording system developed specifically for tree response studies, but which has general application to laboratory and field work where a number of resistance strain gauge records are required. It is battery operated and is calibrated in such a way that it is not affected by supply voltage variations. The particular unit described has a non-linearity of less than 1 per cent of maximum output and is suitable for measuring dynamic strain having frequency components up to 10c/s. (Author)

AD-617 654 Div. 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
TURBO-FLOWMETER FOR AUTOMATIC CONTROL OF A MASSIVE DISCHARGE,
by G. P. Katys and V. V. Blazhnevskii. 9 Jul 65,
7p Rept. no. FTD-TT-65-771
TT 65-62579

Unclassified report

Unedited rough draft trans. of Patent (USSR) 165 321, appl. no. 787475/26-10, 14 Jul 62.

Descriptors: (*Flowmeters, Patents), Automatic, Control systems, Fluid flow, Turbines, Measurement, Turbine wheels, Viscosity, Electric motors, USSR.

In the proposed massive flowmeter a straight-vaned wheel with radial channels located inside of the rotor of the electric motor can turn relative to it by a definite angle of lag. The value for the mass discharge is directly proportional to the interval of time between two contiguous pulses generated by the rotor and the vane wheel with a constant period of sequence. The proposed flowmeter enables one with sufficient precision to measure small masses of discharge of multiphase flows with a broad range of change in viscosity.

AD-617 668 Div. 30/3, 25/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INSTRUMENT FOR MEASURING THE SPEED OF ULTRASOUND,
by S. K. Germanov and Sh. I. Shchitnikov.
21 May 65, 7p Rept. no. FTD-TT-65-467
TT 65-62583

Unclassified report

Unedited rough draft trans. of Russian patent 153145, pub 28 Nov 61, appl. 753513/26-10.

Descriptors: (*Ultrasonic radiation, Measurement), Velocity, Electronic equipment, Polymerization, Rubber, Phase shift, Frequency modulation, Phase measurement, Patents, USSR.

A patent for an instrument for the measurement of ultrasound velocity, for example, during the polymerization of latex is presented. The circuit for measuring phase shift in the carrier frequency is supplemented with a circuit for measuring the phase shift of the modulating frequency thereby eliminating ambiguity when measuring over a wide range of ultrasound velocities.

AD-617 672 Div. 30/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPERIMENTAL DETERMINATION OF PARAMETERS OF THE LAW GOVERNING DISTRIBUTION OF TIME PROBABILITIES BY PRECISE OPERATION OF AN ELECTRONIC APPARATUS,
by L. P. Leontev. 24 May 65, 17p
Rept. no. FTD-TT-65-56
TT 65-62586

Unclassified report

Unedited rough draft trans. of Akademiya Nauk Latviiskoi SSR, Riga. Institut Elektroniki i Vychislitel'noi Tekhniki. Trudy v3 p133-41 1962.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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Descriptors: (*Reliability(Electronics), Electronic equipment), Statistical analysis, Probability, Time, Mathematical prediction, USSR.

For experimental determination of parameters of the law of time probability distribution of correct operation the demarcation of failures by causes of their origination is not necessary. As result of processing experimental data numerial data of dispersion and mathematical expectation of the time of proper operation should be obtained. When determining value lambda it is necessary to consider the time interval, within limits of which aging shows practically no effect on reliability. Parameters of the law of probabilities distribution, determined by numerical values of dispersion and mathematical expectation of proper operation time, offer the possibility of quantitatively evaluating the reliability of trained apparatus during the entire period of its operation.

AD-617 675 Div. 30/5, 25/6, 25/8
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DETERMINATION OF THICKNESS, HEAT CAPACITY AND THERMAL CONDUCTIVITY OF MINIATURE THIN FILMS,
by L. S. Kremenchugskii, V. S. Lysenko, A. F. Malnev, and O. V. Roitsina. 1 Jul 65, 15p
Rept. no. FTD-TT-65-619
TT 65-62589

Unclassified report

Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n2 p3-9 1964.

Descriptors: (*Metal films, Test methods), (*Nickel, Metal films), Thickness, Specific heat, Thermal conductivity, Bolometers, Frequency, Test equipment, USSR.

A new method is presented for the determination of thickness, heat capacity and thermal conductivity of miniature thin films based on their frequency characteristics. Application of the method is illustrated with thin nickel films. (Author)

AD-617 680 Div. 30/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
WIND-TUNNEL BALANCE,
by V. N. Ovshinnikov. 2 Jul 65, 8p
Rept. no. FTD-TT-65-236
TT 65-62594

Unclassified report

Unedited rough draft trans. of Russian patent 148 261, pub 5 Aug 61, appl. 740917/26.

Descriptors: (*Balances, Wind tunnels), (*Wind tunnels, Balances), Measuring devices(Electrical + electronic), Design, USSR, Patents, Electric motors.

The object of the invention is a wind-tunnel balance which contains a sensing system, a string frequency pickup, and an electronic unit for improving the precision of the measurements. A power-converting system is used which is geometrically similar to the system which senses force and connected with it by means of an electric motor with a centrifugal mechanism which converts electrical signals into dynamic force. The power-converting system is provided with a telescopic unit and a movable carriage. (Author)

AD-617 702 Div. 30/3, 25/8
CFSTI Prices: HC$2.00 MF$0.50

Electronics Research Labs., Columbia Univ., New York.
TEMPERATURE DETERMINATION IN MODERATELY DENSE, HIGH-TEMPERATURE GASES BY TRANSIENT THERMOCOUPLE PROBES.
Interim technical rept.,
by P. S. Tschang. May 65, 42p
Contracts AF33 615 1141, AF49 638 1395, Proj. 7063, Task 706303
ARL 65-95

Unclassified report

Descriptors: (*Thermocouples, Analysis), (*Plasma medium, Probes(Electromagnetic), Temperature sensitive elements, Transients, Gases, High-temperature research, Errors, Thermodynamics.

A study was made to determine the bases of the transient methods of the single probe, the dual-probe, and, the intermittent probe for measuring high gas temperatures. Simple parameters critically affecting the probe accuracies have been singled out for comparing the relative merits of the methods under scrutiny. The results indicate no fundamental superiority of any one technique, but in practice the single probe seems most likely to attain the theoretical accuracy by virtue of its simplicity of implementation. The analyses indicate the need to take the variation of all probing parameters into account because of the tendency for these effects to be magnified into large errors resulting in inaccurate gas temperature determination. A novel three-terminal low noise thermocouple sensing element is presented together with its performance in an arc plasma environment. (Author)

AD-617 715 Div. 30/3, 8/2
CFSTI Prices: HC$8.00 MF$2.25

IIT Research Inst., Chicago, Ill.

PHYSICS OF FAILURE IN ELECTRONICS. VOLUME III,
ed. by M. F. Goldberg and Joseph Vaccaro.
1964, 494p

Unclassified report

Symposium held at IIT, Chicago on 29 Sep-1 Oct 64.
Jointly sponsored by Rome Air Development Center.

Descriptors: (*Reliability(Electronics), Symposia), Electronic equipment, Degradation, Aging(Materials), Test methods, Surface properties, Films, Transistors, Capacitors, Diodes, Impurities, Noise(Radio), Semiconductor devices, Semiconducting films.

The proceedings of the 1964 symposium on the physics of failure in electronics held at the Illinois Institute of Technology in Chicago are presented. Papers are presented on: Test, analysis, and correlation; Surface effects; Principles and applications; Effects in films; Bulk effects.

AD-617 758 Div. 30/5
CFSTI Prices: HC$3.00 MF$0.75

Army Materials Research Agency, Watertown, Mass.
A REPORT GUIDE TO MAGNETIC PARTICLE TESTING LITERATURE.
Monograph series rept.,
by Ernest H. Rodgers and Charles P. Merhib.
Jun 65, 81p Rept. no. AMRA-MS-65-04

Unclassified report

Descriptors: (*Non-destructive testing, Reviews), Magnetic materials, Particles, Bibliographies.

The main objective of the compilation is to provide a simple and fast access to information on the subject of magnetic particle testing and also to provide sufficient information in the form of abstracts and word descriptors to make the listing useful. Where available, each item consists of the following information: (1) item, report, or article title, (2) author or authors, (3) source or facility, (4) report number or identification, (5) date, and (6) abstracts.

AD-617 761 Div. 30/6
CFSTI Prices: HC$3.00 MF$0.50

Princeton Univ., N. J. Dept. of Aerospace and Mechanical Sciences.
SOME EFFECTS OF ATMOSPHERIC DISTURBANCES ON AN OPEN RETURN LOW SPEED WIND TUNNEL,
by Alain Gach. Jul 64, 77p Rept. no. 700
Contract AF33 657 12174

Unclassified report

Descriptors: (*Wind tunnels, Atmospheric motion), (*Atmospheric motion, Wind tunnels), Operation, Variable-pitch propellers, Effectiveness.

This report is concerned with the influence of atmospheric disturbances on an open circuit wind tunnel, and in particular the changes in tunnel velocity caused by external wind. Both analytical and experimental studies have been performed, considering first a steady wind, and then periodic gusts. The possibility of cancelling any change in tunnel velocity by means of an automatic variable pitch propeller has been investigated. This would improve the operation of the wind tunnel in the presence of gusts or winds. (Author)

AD-617 780 Div. 24/2
CFSTI Prices: HC$4.00 MF$1.00

Litton Systems, Inc., Canoga Park, Calif. Data Systems Div.
FACTORS AFFECTING RESOLUTION OF ELECTROSTATIC RECORDED AND TONER DEVELOPED IMAGES.
Final technical rept. for Jun 64-Jan 65,
by Fred Smith. Jun 65, 128p
Contract AF30 602 3499, Proj. 5597
RADC TR-65-47

Unclassified report

Descriptors: (*Electrostatics, Display systems), (*Display systems, Electrostatics), Images, Resolution, Dielectric films, Cathode ray tubes, Photographic chemicals, Recording systems.

The report covers studies of the many factors which affect the resolution of an image formed by applying a plastic toner to an electrostatic image formed on a transparent film. Recommended improvements resulting from the studies have been incorporated in an experimental recorder. Measurement of the best resolution achieved was 230 line pairs per inch. The best optical density achieved on the transparent dielectric film was approximately 2 and 10 to 11 gray scale steps were discernible. (Author)

AD-617 835 Div. 24/2, 30/3

Pitman-Dunn Inst. for Research, Frankford Arsenal, Philadelphia, Pa.
RECENT ADVANCES IN DYNAMIC PHOTOELASTICITY,
by Paul D. Flynn. 1964, 8p Rept. no. A64-30
Proj. 1C014501B33A

Unclassified report

Pub. in The Indian and Eastern Engineer, Bombay, India, p83-4 1964 (Copies available only to DDC users).

Descriptors: (*Photoelasticity, High-speed photography), (*High-speed photography, Photoelasticity), Dynamics, Stresses, Configuration, Photographic analysis, Polariscopes, Photographic equipment.

The application of photoelasticity to dynamic stress analysis generally involves the use of high-speed photography. The equipment and techniques which were developed for studying transient stresses in low modulus photoelastic materials are reviewed briefly. The emphasis of the paper is on the use of a special dual-beam polariscope for obtaining simultaneous normal and oblique incidence stress patterns in conjunction with a high-speed framing camera, to study stress wave propagation in high modulus photoelastic materials subjected to explosive loads. Dynamic stress patterns were photographed at speeds up to 720,000 frames per second, using flash tubes and filters to obtain monochromatic light. The procedures are described and typical results are given. (Author)

AD-617 889 Div. 30/3
CFSTI Prices: HC$2.00 MF$0.50

Dayton Univ., Ohio. Research Inst.
A SCRUBBER FUME DISPOSAL SYSTEM FOR ARC-PLASMA-JET TESTING.
Interim progress rept.,
by John Bodner, Joseph DePalma, and Roger Keith.
Sep 64, 31p UDRI-TR-64-111
Contract AF33 616 7838

Unclassified report

Descriptors: (*Gas filters, Plasma jets), (*Plasma jets, Gas filters), Laboratory equipment, Gases, Solids, Sprays, Water, Absorption, Effectiveness.

A design of a fume scrubber using readily-available components is described, which is useful in channeling and disposing of toxic or nuisance gases arising in the

course of flame testing. A cool exhaust is produced, and is under pressure to permit forced venting to the exterior. No moving mechanical parts are employed and corrosion-resistance to permit use of a wide variety of media is easily achieved. An unforeseen benefit is the reduction in noise level resulting from the use of the device, and the scrubber has been found to be of value as an acoustic muffler even in cases where exhaust heat and toxicity are not a problem. Operating characteristics with a variety of media are given. Construction notes are presented for a proposed afterscrubber for gases and various neutralizing tanks for liquids which could be placed in series with the present device if still greater scrubbing effect is desired. (Author)

AD-617 908 Div. 30/5, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
INSTRUMENTS AND EXPERIMENTAL TECHNIQUES, 1964, VOL. 9, NO. 1 (SELECTED ARTICLES).
30 Jun 65, 21p Rept. no. FTD-TT-65 320
TT 65-62617 Unclassified report

Unedited rough draft trans. of Pribory i Tekhnika Eksperimenta (USSR) v9 n1 p121-3, 183-6, 197-8 1964. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Test methods, USSR), (*Instrumentation, Laboratory equipment), (*Test equipment, USSR), Suppressors, Signal-to-noise ratio, Correlators, Synchronization(Electronics), Magnetic fields, Wiring diagrams, Nuclear magnetic resonance, Computers, Diffusers, Crystal lattice defects, Germanium, Silicon, Crystals, Semiconductors, Statistical analysis, Alcohols, Gas diffusion separation.

Contents: Suppression of Noise When Observing a Nuclear Magnetic Resonance Signal of a Magnetic Field Measurer, by G. S. Anufriev, O. F. Afonin, and B. A. Mamyrin; Automatic Calculation of Dislocations, by A. L. Sobolev and Yu. V. Sokurenko; Determining The Composition of Filling a Diffusion Chamber in Its Sensitive Layer, by L. V. Bakanov, A. P. Grayevskiy, V. D. Lebedev, and M. V. Stabnikov.

15. Military Sciences

AD-617 257 Div. 18/4
CFSTI Prices: HC$2.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
INVESTIGATION OF MATERIAL HANDLING EQUIPMENT FOR AMPHIBIOUS LANDINGS (OVER-THE-BEACH CONVEYOR).
Technical note,
by R. C. Towne, B. H. Bryner, and G. D. McDougall.
May 65, 44p Rept. no. TN-715
Proj. Y F015 03 01 001

Unclassified report

Descriptors: (*Amphibious operations, Logistics), (*Cargo, Amphibious operations), (*Handling, Cargo), (*Conveyors, Amphibious operations), Shipping(Marine), Loading, Programming(Computers), Systems engineering, Analysis, Amphibious vehicles, Landing craft.

The requirement exists to improve the efficiency of the logistic support system used during the amphibious assault and the initial advance base supply. Study of the overall problem of cargo handling in amphibious operations is being conducted with emphasis on over-the-beach aspects. Analysis of the relationships of material handling equipment, transfer vehicles, supply weights, sea and beach conditions and the multitude of other related parameters is being expedited by the use of a computer program (ALMS-Amphibious Logistics Mathematical Simulation). This investigation describes the parametric studies and comparisons made between existing ship-to-shore cargo handling systems and a proposed over-the-beach conveyor. Results of the analysis of physical and operational factors preclude the construction of an assault conveyor system. (Author)

AD-617 266 Div. 18/1, 18/7, 32/8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ON STABILITY IN DETERRENT RACES.
Revised ed.,
by Malcolm W. Hoag. Sep 61, 43p Rept. no. P-2188-1

Unclassified report

Revision of rept. dated Jan 61, AD-425 821.

Descriptors: (*Deterrence, National defense), Arms control, Cold war, Nuclear weapons, Limited war, Defense systems, Military strategy, Political science, History, Stability, Theory.

AD-617 384 Div. 18/2, 6/6
CFSTI Prices: HC$2.00 MF$0.50

HRB-Singer, Inc., State College, Pa.
SIMULATION RESEARCH ON NON-IMAGE SENSOR SYSTEMS.
Interim rept.,
by Joseph L. Oneill. Jul 65, 26p
Rept. no. 352-R-16
Contract Nonr381800

Unclassified report

Descriptors: (*Electronic recording systems, Aerial reconnaissance), (*Aerial reconnaissance, Simulation), (*Military intelligence, Aerial reconnaissance), (*Detection, Aerial reconnaissance), Models(Simulations), Computers, Programming(Computers), Systems engineering.

This report describes interim results in a research effort on simulation methodologies. The concern is with advanced intelligence collection systems capable of operating in any environment and in any spectral or force field region. The work is being done for the Information Systems Branch of the Office of Naval Research. (Author)

AD-617 708 Div. 18/7, 22/13
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Test Station, China Lake, Calif.
THE PREDICTION-EVASION PROBLEM IN ASW: A THEORETICAL APPROACH,
by B. W. Arveson. May 65, 87p NOTS-TP-3751
Task RUSD2A000 216 1W002A0 009
NAVWEPS 8708

Unclassified report

Descriptors: (*Tactical warfare, Theory), (*Anti-submarine warfare, Tactical warfare), Evasion, Mathematical prediction, Game theory, Underwater ordnance.

This report presents a theoretical study of the prediction-evasion problem existing between a destroyer and a possibily hostile submarine, after sonar contact has been established but before any weapons have been deployed. The analysis culminates in the evaluation of strategies which are in a sense optimal for both participants simultaneously. The technique lends itself to the analysis of other tactical situations not considered here. (Author)

AD-617 734 Div. 18/1, 26/2
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
A SYSTEM ANALYSIS OF CIVIL DEFENSE ORGANIZATION AT THE REGIONAL, STATE, AND LOCAL LEVELS. INITIAL REPORT: SYSTEM DEFINITION AND PROBLEM IDENTIFICATION,
by Arthur A. McGee and Richard C. Katz.
May 65, 95p
Contracts OCD PS64 201, OCD OS63 149,
Projs. MU4949 410, 4536 432, Tasks 4411B, 4411C

Unclassified report

Descriptors: (*Civil defense systems, Management planning), United States Government, Department of Defense, National defense, Management control systems, Management engineering, Warning systems, Survival, Food, Water supplies, Communication systems, Transportation, Medical personnel, Medical supplies, Civil defense personnel, Education, Economics, Banking, Urban areas.

The report presents a broad analysis of the civil defense system and organization at the regional, state and local levels of government. From this analysis the study identifies major system problems with organizational implications and discusses, but does not quantitatively evaluate, alternative solutions to these problems. (Author)

AD-617 791 Div. 18/3
CFSTI Prices: HC$5.00 MF$1.00

Department of Defense, Washington, D. C.
PROCEEDINGS OF LOGISTICS RESEARCH CONFERENCE, 26, 27, 28 MAY 1965, WARRENTON, VIRGINIA. VOLUME I.
28 May 65, 170p

Unclassified report

Descriptors: (*Logistics, Symposia), Scientific

research, Simulation, Maintenance, Inventory analysis, Procurement, Army, Navy, Air Force, Management planning.

The first DoD-sponsored logistics research conference addressed itself principally to improving communications among researchers with the ultimate aim of directing increasing attention to more significant problems of management and the implementation of research findings. The conference brought together 135 persons from in-house research organizations, civilian universities and non-profit organizations who are performing logistics research for some component of Defense. An opening general session was concerned with an appraisal of logistics research and a review of the management of such research. The conference then broke down into 9 panel sessions, each addressing itself to a major logistics management area. The last day of the conference was devoted to panel reports.

16. Missile Technology

AD-617 413 Div. 12/1, 13/4
CFSTI Prices: HC$5.00 MF$1.00

Texas Univ., Austin.
SOIL RESPONSE ON THREE GEOMETRIC SHAPES DURING IMPACT.
Doctoral thesis,
by Arthur Reginald Poor. May 65, 164p
Unclassified report

Research supported by National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Soil mechanics, Landing impact), (*Impact shock, Soil mechanics), (*Spacecraft, Landing impact), Landing gear, Configuration, Plating, Spheres, Conical bodies, Landings, Soils, Deformation, Test equipment, Test methods.

An experimental investigation was performed to define the soil response on three geometric shapes during impact. Two sizes of vehicles were utilized having plate, sphere and cone configurations with constant ratios of diameter, available surface contact area, and weight being maintained between each size. Impact velocity and mass were varied for each series of test vehicles. The acceleration-time history of the reactive soil forces on the impacting vehicle was recorded on an oscilloscope utilizing accelerometers as the sensing devices. Analysis was accomplished by computer program to obtain the magnitude of reactive force as a function of deformation. A modulus of deformation was determined as a constant for each geometric configuration. The magnitude of reactive force was a function of vehicle mass and impact velocity. Equations for the modulus of deformation and maximum reactive force were defined to permit prediction by extrapolation of the phenomenological behavior of larger vehicles. (Author)

AD-617 517 Div. 12/1
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge.
DYNAMICS OF A SOLAR PRESSURE STABILIZED SATELLITE.
Master's thesis,
by John Raymond Carroll and Robert Charles Limburg.
Jun 65, 71p
Contract NASr249
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Satellites(Artificial), Celestial mechanics), (*Celestial mechanics, Satellites-(Artificial)), (*Astronautics, Satellites(Artificial)), Stabilization systems, Solar wind, Orbital trajectories, Sun, Equations, Motion, Mathematical models, Programming(Computers).

It is the objective of this thesis to investigate the body dynamics of a solar pressure stabilized satellite in a heliocentric orbit of nonzero eccentricity. The equations of motion for an unsymmetrical satellite are simplified by finding satellite equilibrium position and making small angle assumptions about this position to linearize the equations. The motions predicted by the simplified model are compared with digital computer solutions of the general equations of motion. Passive damping and injection of the satellite into orbit are investigated briefly. In its equilibrium position, the satellite has one principal axis along the radial line. Of the two remaining principal axes, the one with the greater moment of inertia is perpendicular to the orbital plane. For the simplified model, motion about the three principal axes can be uncoupled for small disturbances from equilibrium. Motion about the radial line is characterized by oscillations at approximately orbital frequency rate. (Author)

AD-617 541 Div. 16/7, 16/8

California Univ., Berkeley. School of Optomet.y.
A METHOD OF PHOTOELECTRIC KERATOSCOPY.
Technical rept.,
by Gerald Westheimer. 10 Jan 65, 7p Rept. no. TR-7
Contract Nonr22282, Proj. NR140 195
Unclassified report

Pub. in American Journal of Optometry and Archives of American Academy of Optometry p315-20 May 1965. (Copies not available to DDC or Clearinghouse customers). Prepared for presentation before the Annual Meeting of the American Academy of Optometry, Chicago, Ill. December 10, 1963.

Descriptors: (*Cornea, Surface properties), (*Medical equipment, Recording systems), (*Ophthalmology, Recording systems), Reflection, Eye, Photoelectric effect, Theory, Photomultipliers, Photoelectric cells-(Semiconductors).

The utilization of modern photoelectric devices makes possible the automatic recording of parameters of the cornea as a reflecting surface from which the topography of the cornea may be reconstructed. The method is novel in that photoelectric rather than visual or photographic detection is employed. The consequent advantages, such as speed of recording, immediate availability of output, and versatility of output form to suit computational and other processing needs, may make a method such as this more suitable for some purposes than conventional photokeratoscopy.

17. Navigation, Communications, Detection, and Countermeasures

AD-617 265 Div. 5/2, 8/7
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE LINK FROM A COMMUNICATION SATELLITE TO A SMALL GROUND TERMINAL,
by N. E. Feldman. Mar 64, 30p
Rept. no. P-2884
Unclassified report

Results of the study were reported in RAND RM-3514-NASA; Contract NASr-21(02).

Descriptors: (*Communication satellites(Active), Communication theory), (*Communication satellites-(Passive), Communication theory), (*Communication theory, Communication satellites(Active)), (*Communication systems, Communication satellites(Active)), Ground support equipment, Cost, Performance(Engineering), Feasibility studies, Microwave communication systems, Systems engineering.

The feasibility of low-capacity point-to-point voice communication satellite systems is examined. Low capacity here means between one teletype channel and about thirty voice channels.

AD-617 300 Div. 19/3
CFSTI Prices: HC$4.00 MF$0.75

Wisconsin Univ., Madison.
TACAN FOR SPACE NAVIGATION,
Master's thesis,
by Myles Joseph Standish, Jr. 1965, 109p
Unclassified report

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Descriptors: (*Space navigation, Radio navigation), (*Radio navigation, Space navigation), (*Navigational aids, Radio navigation), Airborne, Distance-measuring equipment, Ground support equipment, Radio beacons, Satellites(Artificial).

This paper investigates the possibility of using an established aircraft navigational aid for near space navigational purposes. This facility, a pulse beacon called TACAN, is installed in nearly 800 locations world-wide. It is concluded that with some modifications of the pulse patterns at selected beacons along with receiver improvements it would be possible to service satellites to a 2500 n.m. range. The modifications proposed do not degrade the ability of the ground beacon to perform their normal aircraft navigational support. Resultant orbit determination accuracy is evaluated as comparable in magnitude with VERLORT Mod II beacon type radars now used extensively by the United States to track satellites. (Author)

AD-617 325 Div. 6/3
CFSTI Prices: HC$2.00 MF$0.50

David Sarnoff Research Center, Princeton, N. J.
LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
Semiannual rept. for 1 Dec 64-31 May 65,
by M. L. Schultz, W. E. Harty, and C. D. Rowley.
25 Jun 65, 42p
Contract Nonr222500
Unclassified report

See also AD-406 088.

Descriptors: (*Infrared photoconductors, Cryogenics), Ionization, Germanium alloys, Zinc alloys, Copper alloys, Photoconductivity, Gain, Voltage, Electric fields, Noise(Radio), High frequency, Electromagnetic pulses, Low-temperature research.

The report summarizes the results of some experiments which have been performed in order to explore the possibility of utilizing extrinsic impact ionization as a means of increasing the carrier generation rate.

AD-617 345 Div. 6/1, 25/1
CFSTI Prices: HC$2.00 MF$0.50

Ohio Univ., Athens. Dept. of Physics.
ACOUSTIC INTERACTION FOR LINEAR ARRAYS OF SMALL MAGNETOSTRICTIVE-STACK SONAR TRANSDUCERS AT AN AIR-WATER SURFACE.
Annual summary rept. no. 1,
by Folden B. Stumpf and Omer J. Barrier. 1 Jun 65, 49p
Contract Nonr441901, Projs. NR185 601, RF001 03 05
Unclassified report

Descriptors: (*Sonar equipment, Transducers), (*Transducers, Sonar equipment), (*Acoustics, Sonar equipment), (*Magnetostrictive elements, Tranducers), Air, Water, Surface area, Acoustic impedance.

Experiments and a theoretical development for the acoustic interaction among small transducers in linear arrays of two, three, and four at an air-water surface are described. The interaction radiation resistance is studied as a function of number, spacing, relative position, relative phase, and relative amplitude of the transducers. Suggestions as to ways of eliminating deleterious interaction are presented. (Author)

AD-617 414 Div. 19/3
CFSTI Prices: HC$2.00 MF$0.50

North Dakota Univ., Grand Forks.
AURAL RECEPTION OF INSTRUMENT LANDING SYSTEM SIGNALS.
Master's thesis,
by Roger F. Anduaga Arias. Mar 65, 26p
Contract AF33 608 1093
Unclassified report

Descriptors: (*Instrument landings, Radio communication systems), (*Radiocommunication systems, Acoustic signals), (*Acoustic signals, Landing aids), Trigger circuits, All-weather aviation, Relaxation oscillators, Auditory signals.

The Instrument Landing System (ILS) receiver is coupled to a meter on the instrument panel which gives the pilot a visual reference of his position relative to the glide path and center-line of the runway. A way is demonstrated by which the ILS can in addition be made to electronically supply an audible signal to assist the pilot in his approach to a landing. The outputs from the ILS receiver are voltages whose levels are proportionate to the angular distances from the center-line of the runway and the glide path. These output voltages supply the threshold triggers for a series of Schmitt Triggers. By coupling the Schmitt Triggers into a network of sequentially triggered monostable multivibrators, a pair of signal generators can be made to produce audible

signals that identify the aircraft's position. In effect, this system is an intermediary between the Ground Control Approach (GCA) voice system and the ILS.

AD-617 528 Div. 19/4, 12/2
CFSTI Prices: HC$4.00 MF$0.75

Raytheon Co., Sudbury, Mass. Space and Information Systems Div.
VEHICLE-FIXED COMPONENT INERTIAL GUIDANCE SYSTEM STUDY,
by Charles Broxmeyer and Howard Wishner. Dec 64, 114p
Contract N60530 10010, Task 4068 1
NOTS TP-3715; NAVWEPS 8668

Unclassified report

Descriptors: (*Inertial guidance, Numerical methods + procedures), (*Inertial navigation, Numerical methods + procedures), (*Data processing systems, Inertial navigation), Guided missile computers, Mathematical programming, Vector analysis.

The general structure of a vehicle-fixed component inertial navigation system is outlined. The portion of the computation problem pertaining to the computation of direction cosines relating two rotating coordinate frames is discussed, and the differential equations satisfied by the direction cosines is derived. A brief description is given of the principal problems encountered in the vehicle-fixed operation of components. Three algorithms for the computation of direction cosines in the single-axis case are derived. The direction cosine differential equation is solved by expansion in series and three-axis algorithms defined specialization of the correct solution. The noncommutativity problem is discussed and a method suggested for reducing errors resulting from noncommutativity. The algorithms applicable to single-axis motion are specified and combined with simple assumptions on vehicle motion, to yield sets of difference equations. The difference equations are solved and the errors in the direction cosines plotted against functions proportional to time. The requirements of special-purpose computers designed to implement the three-axis algorithms are outlined and the general organization, and the parameters, of several computers, is given. (Author)

AD-617 535 Div. 6/6, 8/3
CFSTI Prices: HC$4.00 MF$1.00

Naval Ordnance Test Station, China Lake, Calif.
A THEORETICAL CONTINUOUS WAVE (CW) MULTIPATH ANALYSIS FOR WAVELENGTHS FROM 3 TO 10 CM,
by Richard S. Hughes. Aug 65, 145p
Rept. no. NOTS-TP-3776
NAVWEPS 8725

Unclassified report

Descriptors: (*Multipath radar, Continuous wave radar), (*Continuous wave radar, Multipath radar), Doppler effect, Radar reflections, S band, X band, Radar receivers, Multipath transmission, Angle of arrival.

A CW sensor approaching a transmitter is beset by two basic problems: signal multipath and sensitivity. This report is intended to give some insight into the problem of signal multipath. It is felt that only the bistatic reflection (that reflected from a building, radar van, house, etc.) is of primary concern. A doppler shift is associated with this reflection. A complete set of curves of the doppler shift for various sensor-reflector-transmitter configurations is given. (Author)

AD-617 536 Div. 5/2, 8/6
CFSTI Prices: HC$2.00 MF$0.50

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
DATA ANALYSIS OF ECHO I, II, AND THE MOON. VOLUME I. AN ANALYSIS OF ECHO II REFLECTED SIGNALS AT 2 KMC/SEC.
Interim rept. no. 2, Jan-Sep 64,
by S. L. Zolnay and J. W. Eberle. May 65, 48p
Contract AF30 602 2166, Proj. 4519, Task 451901
RADC TR-65-67 V1

Unclassified report

Descriptors: (*Communication satellites(Passive), Performance(Engineering), (*Radio communication systems, Communication satellites(Passive)), Ultrahigh frequency, Radio transmission, Ionospheric propagation, Electromagnetic wave reflections, Radiofrequency power, Communication theory, Data processing systems.

This report presents an analysis of the level of the received power which originated from the Floyd Passive Satellite Research Terminal in the form of 4- 10 millisecond pulses at 2.27 KMC as reflected from Echo II. An analysis one on the instantaneous basis and one on the averaged basis (tau = 0.05, 0.2 sec) was carried out. From the instantaneous analysis it was found that rapid fades on the order of 1/20th of one second often occurred with a depth as large as 20 dbs. Fades on the order of 10 db are more common, and 3-5 db continuous variations are characteristic of the Echo II link. Pulse amplitude distortion was found to be probably ascribable to the doppler shift due to the balloon's rotation. The depth and severity of the fades, as well as the frequency of their occurrence was readily observable from the averaged, smoother data also. The averaged data show a 3-5 db consistent discrepancy which, in the light of the accuracy of the measurements, is more on the order of 1 to 3 decibels. Echo II appears to present a radar cross-section 1 to 3 decibels below the one calculated on the basis of geometrical cross-section. (Author)

AD-617 537 Div. 5/2, 8/6, 2/1
CFSTI Prices: HC$2.00 MF$0.50

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
DATA ANALYSIS OF ECHO I, II, AND THE MOON. Volume III. THE SURFACE ROUGHNESS OF ECHO II, ECHO I, AND THE MOON AS OBTAINED FROM AMPLITUDE STATISTICS,
by J. W. Eberle. May 65, 29p
Contract AF30 602 2166, Proj. 4519, Task 451901
RADC TR-65-67 V3

Unclassified report

See also AD-617 536.

Descriptors: (*Communication satellites(Passive), Surface properties), (*Radio communication systems, Communication satellites(Passive)), (*Moon, Electromagnetic wave reflections), Radio transmission, Ionospheric propagation, Electromagnetic wave reflections, Attenuation, Statistical functions, Pulse analyzers, Communication theory.

The first amplitude probability density functions of signals reflected from Echo II, Echo I and the Moon are compared. From the density functions for Echo II, the ratio of specular power (correlated) to scattered power (uncorrelated) and the range of fading are obtained, from which the behavior of the surface characteristics are obtained as a function of time during the first four months in orbit. (Author)

AD-617 557 Div. 5/2, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
RECEPTION VIA THE SYNCOM II COMMUNICATION SATELLITE USING AN 8-FOOT PARABOLIC ANTENNA,
by W. E. Leavitt and J. P. Spraitz. 17 May 65, 19p NRL Memo. rept. 1617
Proj. SF019 02 04 7451

Unclassified report

Descriptors: (*Communication satellites(Active), Radio reception), (*Radio reception, Communication satellites(Active)), (*Parabolic antennas, Communication satellitesactive)), Radio communication systems, Transponders, Parametric amplifier, Frequency modulation, Demodulation, Radio signals, Voice communication systems.

Signals transmitted by the U.S. Army Satellite Communication Agency's Camp Roberts terminal via Earth satellite SYNCOM II were received at the Naval Research Laboratory using an eight-foot diameter parabolic antenna feeding into a parametric amplifier. The antenna system configuration provided performance capability equivalent to a 5.7-foot diameter parabolic antenna with 237K noise temperature. Phase lock frequency modulation detection circuitry was used for demodulation of the received signal. Voice reproduction was slightly distorted when the satellite was operating in the simplex mode with the Camp Roberts transmitter adjusted for 200 watts input to its 60-foot antenna (radiation efficiency - 55%). Received signal strength was found to be in agreement with predicted values. (Author)

AD-617 612 Div. 6/6, 18/2, 15/2
CFSTI Prices: HC$3.00 MF$0.75

Operations Research Center, Mass. Inst. of Tech., Cambridge.
A PROGRAM OF RESEARCH ON THE APPLICATIONS OF ADAPTIVE SYSTEMS AND STATISTICAL DECISION THEORY TO THE PROBLEMS INVOLVED IN THE DETECTION OF ENEMY OPERATIONS.
Final rept. for 1 Jan 63-31 Dec 64,
by M. Golberg, G. R. Murray, Jr., and D. K. Ray.
Feb 65, 91p Technical rept. no. ORC-TR-14
Contract AF19 628 2435, Proj. 4691, Task 469103
AFCRL 65-104

Unclassified report

Descriptors: (*Detection, Operations research), (*Operations research, Detection), (*Military intelligence, Detection), (*Statistical analysis, Detection), Mathematical models, Systems engineering, Television display systems, Signal-to-noise ratio, Configuration, Center of gravity, Brightness.

This report summarizes the research performed on two problems: (1) to create and investigate models for the entire search, detection, and decision system, useful for determining the operating conditions for overall system optimality; (2) to investigate the statistical and probabilistic problems associated with TV bandwidth reduction studies. Part I reports on several models of search and detection in which detection stations are fixed and the objects sought are free to move about. Consideration is particularly given to the nature of the noise field in which the system operates. The problem considered is where to place detection stations and how to process the incoming signal for one station alone and for the system as a whole. The nature of the mathematical difficulties encountered in reaching a solution to this problem is presented. Studies reported on problem (2) include a mathematical algorithm for computing the area size distribution for points randomly illuminated on the TV screen, a comparison of the statistical properties of various masking techniques that may be applied in raster scanning, and an analysis of the motion of the center of illumination of the TV screen. (Author)

AD-617 669 Div. 5/2, 30/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
STANDARD OF PROGRESS,
by V. Kalmykov. 25 Jun 65, 9p
Rept. no. FTD-TT-65-705
TT 65-62584

Unclassified report

Unedited rough draft trans. from Izvestiya (USSR) 22May p5 1965.

Descriptors: (*Radio communication systems, Reviews), (*Data transmission systems, Reviews), Radio equipment, Computers, Control, Weapon systems, Space flight, USSR.

The state-of-the-art in radioelectronics is discussed. Possible applications of the technology are presented.

AD-617 670 Div. 5/2, 8/6, 12/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
RADIO COMMUNICATION WITH INTERPLANETARY STATIONS, (AND) FLIGHT INTO A DREAM,
by I. Boloshin and V. Kusnetsov. 10 Dec 62, 9p
Rept. no. FTD-TT-62-1776
TT 65-62585

Unclassified report

Unedited rough draft trans. from Krasnaya Zveszda (USSR) 4 Nov p3 1962.

Descriptors: (*Space communication systems, Radio communication systems), (*Radio communication systems, Space communication systems), Extraterrestrial bases, Mars probes, Communication theory, USSR.

Possible techniques of radio communication between interplanetary stations and earth are discussed. The flight of the Mars 1 spacecraft is also briefly mentioned.

AD-617 750 Div. 5/2, 8/1
CFSTI Prices: HC$6.00 MF$1.25

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
AN ADAPTIVELY PHASED, FOUR-ELEMENT ARRAY OF THIRTY-FOOT PARABOLIC REFLECTORS FOR PASSIVE (ECHO) COMMUNICATION SYSTEM.
Interim rept. for Jan 64-Jan 65,
by Jon W. Eberle. Jun 65, 221p
Contract AF30 602 2166, Proj. 4519, Task 451901
RADC TR-65-69

Unclassified report

Descriptors: (*Phased arrays, Parabolic antennas), (*Space communication systems, Parabolic antennas), (*Parabolic antennas, Phased arrays), (*Communication satellites(Passive), Adaptive communication systems, Communication equipment, Ground support equipment, Phased-locked communication systems, Gain, Signal-to-noise ratio, Systems engineering.

This report describes an array of four, thirty-foot diameter independently steerable antennas designed to operate in a passive communications satellite environment. The array is adaptively placed to provide signal coherence and combining prior to detection. An analysis is presented of the various phase-locked loops in the array. The modes of operation and the design considerations for the array are discussed in detail. Results of operating the array with Echo I, Echo II, and the moon are presented and discussed. (Author)

AD-617 751 Div. 5/2, 8/1
CFSTI Prices: HC$2.00 MF$0.50

Antenna Lab., Ohio State Univ. Research Foundation, Columbus.
A TECHNIQUE FOR ACHIEVING VERY HIGH ANTENNA GAIN. THE ADAPTIVELY PHASED ARRAY.
Final rept. for Jan 60-Dec 64,
by J. W. Eberle and S. L. Zolnay. Jun 65, 47p
Rept. no. 1072-F
Contract AF30 602 2166, Proj. 4519, Task 451901
RADC TR-65-108
Unclassified report

See also AD-617 750.

Descriptors: (*Phased arrays, Parabolic antennas), (*Parabolic antennas, Space communication systems), (*Space communication systems, Parabolic antennas), Communication satellites(Passive), Adaptive communication systems, Gain, Phase distortion, Bandwidth, Signal-to-noise ratio.

The design considerations of a phased array antenna system are given. The antenna was designed to demonstrate the adaptive phasing principle as applied to achieving high antenna gain in a communication satellite environment. Factors such as phase perturbances, signal distribution within the array, array bandwidth and pattern control are considered. An adaptively phased array consisting of four thirty-foot parabolic reflectors is described. Additionally the results obtained from the array in regard to signal-to-noise improvement as obtained in experiments with Echo II as well as signature studies of Echo II signals are described. (Author)

AD-617 757 Div. 19/3
CFSTI Prices: HC$1.00 MF$0.50

Systems Research and Development Service, Federal Aviation Agency, Washington, D. C.
CHARACTERISTICS FOR AN AIR TRAFFIC CONTROL RADAR BEACON SYSTEM (ATCRBS) TRANSPONDER IN-FLIGHT MONITOR (TIM).
Technical rept.,
by Kenneth Wise. Jun 65, 7p Rept. no. RD-65-71
Unclassified report

Descriptors: (*Monitors, Transponders), (*Transponders, Air traffic control systems), (*Radar beacons, Transponders), Airborne, Specifications.

The document describes the operation and use of an ATC Transponder In-Flight Monitor and defines its characteristics. Deviation from these characteristics may result in a device that is either useless to the owner or harmful to the Air Traffic Control Radar Beacon System (ATCRBS). A recommendation is made that those characteristics deemed potentially harmful to the ATCRBS, be limited to the specified levels by means of an FAA Selection Order. (Author)

18. Nuclear Science and Technology

AD-617 319 Div. 20/5, 17/5
CFSTI Prices: HC$2.00 MF$0.50

Naval Research Lab., Washington, D. C.
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS 1 FEBRUARY-30 APRIL 1965.
Quarterly progress rept. for 1 Feb-30 Apr 65,
by L. E. Steele, J. R. Hawthorne, and H. E. Watson.
15 May 65, 32p NRL Memo rept. 1611
Contract AT49 5 2110, Proj. SR007 01 01, Task 0858
Unclassified report

See also AD-609 272.

Descriptors: (*Reactor materials, Steel), (*Steel, Radiation damage), (*Radiation damage, Reactor materials), Brittleness, Ductility, Tensile properties, Stresses, Structural parts.

This report includes the following: (1) irradiation embrittlement of several heats of ASTM Type A302-B steel at 550 F, (2) notch ductility and tensile properties of an Fe-Cr-Al-Y alloy before and after irradiation, (3) simultaneous irradiation of Charpy-V and drop weight specimens of A212-B, A302-B, and A350-LF1 (Modified) steels, (4) effect of stress during irradiation on the notch ductility of A350-LF1 (Modified) steel, and (5) a remotely operated milling machine for hot cell operations. (Author)

AD-617 524 Div. 20/6, 18/1
CFSTI Prices: HC$3.00 MF$0.75

Conesco, Inc., Cambridge, Mass.
THE BARRIER ATTENUATION INTRODUCED BY A VERTICAL WALL.
Final technical rept.,
by C. McDonnell, J. V. Velletri, A. W. Starbird, and J. F. Batter. 1 Sep 64, 62p
Contract DA18 020ENG3096, Proj. OCD OS63 148, Task 1117A
PSDC TR-15
Unclassified report

Descriptors: (*Radioactive fallout, Shielding), (*Shielding, Shelters), (*Radiological contamination, Shielding), Structures, Buildings, Thickness, Dosimeters, Dose rate, Instrumentation, Gamma rays, Concrete, Experimental data, Tables, Statistical analysis, Tests.

A series of tests designed to evaluate the attenuation introduced by a vertical wall adjacent to a horizontal field of contamination is described. The variation of the resultant attenuation with height is found to agree well with theory. Actual attenuation values measured are higher than those theoretically predicted by an amount equivalent to approximately eight percent of the wall thickness. (Author)

AD-617 662 Div. 20/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A HIGH-CURRENT IMPULSE ION SOURCE,
by M. A. Abroya and V. L. Komarov. 20 May 65,
21p Rept. no. FTD-TT-65-449
TT 65-62577
Unclassified report

Unedited rough draft trans. of Elektrofizicheskaya Apparatura (USSR) v1 p119-33 1963.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Ion sources, Particle accelerators), (*Ion beams, Particle accelerator techniques), Plasma physics, Plasma medium, Focusing, Magnetic fields, Synchrotrons, USSR.

The article is devoted to the duoplasmatron type impulse ion source intended for the preinjector of a synchrophasotron.

AD-617 709 Div. 20/6, 22/2
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
RADIOACTIVE PELLET TRAJECTORY STUDY.
Final rept.,
by J. Allen. 6 Jul 65, 31p
PNE 218F
Unclassified report

Report on Project Sedan, Nevada test site, Jul 6, 1962.

Descriptors: (*Cratering, Soil mechanics), (*Tracer studies, Soil mechanics), (*Nuclear explosions, Cratering), Underground explosions, Ejection, Ballistics, Cobalt.

An attempt was made to investigate the manner in which earth is ejected ballistically from a nuclear cratering experiment. Eighty-eight radioactive pellets (Co60) were buried at known locations and depths prior to the event. After detonation a vehicle-mounted gamma scanner was used to survey the predicted angle of ejection and the northwest quadrant from ground zero. No preshot planted Co60 sources were recovered. (Author)

AD-617 722 Div. 20/3
CFSTI Prices: HC$1.00 MF$0.50

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST ABSTRACT NO. 27757 TO 27812, PART I.
Rept. for 1-30 Jun 65.
10 Jul 65, 24p REIC Accession List 88
Contract AF33 615 1124
Unclassified report

Descriptors: (*Radiation damage, Materials), (*Materials, Radiation damage), (*Bibliographies, Radiation damage), Radiation chemistry, Abstracting, Ceramic materials, Metals, Organic materials, Polymers, Electronic equipment, Space enviromental conditions, Semiconductor devices, Electromagnetic waves.

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Polymeric Materials;
Inorganic Materials;
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Facilities;
Space Environment and Effects on Materials;
Experimental Devices and Techniques;
Miscellaneous.

AD-617 784 Div. 20/3
CFSTI Prices: HC$2.00 MF$0.50

General Electric Research Lab., Schenectady, N. Y.
RESEARCH INTO RADIATION DAMAGE EFFECTS

IN SOLIDS.
Final rept. for 1 Apr 62-31 Mar 65,
by R. L. Fleischer, P. B. Price, and R. M. Walker.
Jun 65, 35p Rept. no. 65-GC-0312M
Contract AF19 628 369, Proj. 5620, Task 562002
AFCRL 65-305

Unclassified report

Descriptors: (*Radiation damage, Solids), (*Solids, Radiation damage), Scientific research, Aging-(Materials), Measurement, Plastics, Mica, Glass, Polyester plastics, Zirconium compounds, Silicates, Quartz, Cellulose acetates, Nitrocellulose.

The work has shown that almost all insulating solids, including natural minerals, glasses, and plastics record tracks of nuclear charged particles. After first describing the nature of tracks in solids and ways of seeing them, we show how they have been used in such diverse problems as measuring the age of geological and archeological specimens, studying the early history of the solar system recorded in meteorites, observing nuclear interactions, determining neutron fluxes, and separating biological cells of different sizes. (Author)

AD-617 880 Div. 20/5, 15/1
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ENERGY-DEPENDENT NEUTRON TRANSPORT THEORY IN PLANE GEOMETRY. II. EIGENFUNCTIONS AND FULL-RANGE COMPLETENESS,
by A. Leonard and Joel H. Ferziger. Jun 65, 40p
Rept. no. P-3166

Unclassified report

Prepared in cooperation with Stanford Univ., Calif.

Descriptors: (*Neutron transport theory, Geometry), (*Functions, Neutron transport theory), Energy, Partial differential equations, Green's function, Integral equations, Series, Neutron cross sections.

An earlier treatment of the energy-dependent transport equation is extended to include the case in which cross sections are functions of energy. The technique again consists of finding solutions to the homogeneous transport equation after expanding in terms of a complete set of functions in the energy variable. The full-range completeness theorem for these eigenfunctions requires the solution of a coupled set of singular integral equations. This solution is effected by a generalization of a trick used by Case and is applied to the problem for the infinite medium Green's function. Numerical results are given for a heavy gas model. The half-range completeness theorem, which may be applied to half-space and finite slab problems, is proven in a companion paper. (Author)

AD-617 882 Div. 20/5, 15/1
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ENERGY-DEPENDENT NEUTRON TRANSPORT THEORY IN PLANE GEOMETRY. III. HALF-RANGE COMPLETENESS AND HALF-SPACE PROBLEMS,
by A. Leonard and Joel H. Ferziger. Jun 65, 35p
Rept. no. P-3167

Unclassified report

Prepared in cooperation with Stanford Univ., Calif.

Descriptors: (*Neutron transport theory, Geometry), (*Integral equations, Neutron transport theory), Energy, Neutron scattering, Matrix algebra, Albedo, Green's function, Polynomials, Reactor moderators.

A set of elementary solutions to the energy-dependent Boltzmann equation, which was derived in an earlier paper, is shown to possess a half-range completeness property allowing the exact solution to energy-dependent half-space problems and the reduction of finiteslab problems to rapidly convergent Fredholm equations. Results follow in analogy with Case's work on the one-velocity transport equation except that a system of singular integral equations is encountered, giving rise to the Hilbert problems for matrices. It is shown that the methods of Muskhelishvili and Vekua are applicable to this matrix problem and lead to the consideration of a class of Fredholm equations to obtain the solution. The explicit form the Fredholm equation for the present problem is derived by extending the analysis of the scalar Hilbert problem to the matrix case. Applications of the completeness proof are made to the albedo and Milne problems for a half-space. (Author)

AD-617 884 Div. 20/8, 13/4, 20/2
CFSTI Prices: HC$1.50 MF$1.00

Army Engineering Nuclear Cratering Group., Livermore, Calif.
PROJECT PRE-BUGGY II JUNE-AUGUST 1963: STUDIES OF THE PRE-BUGGY II APPARENT CRATERS.
Final rept.,
by Joseph L. Spruill and Fred F. Videon. Jun 65,
141p
PNE 315F

Unclassified report

Rept. on Plowshare.

Descriptors: (*Nuclear industrial applications, Cratering), (*Cratering, Underground explosions,), (*Underground explosions, Cratering), Explosive materials, Liquids, Explosion effects, Deserts, Soil mechanics, Civil engineering, Nitrogen compounds, Methane, Nuclear explosions.

Project Pre-Buggy II consisted of the detonation of five rows of five charges each, one row of 13 charges, and four single charges, at the Nevada Test Site during June and August 1963. Each charge was 1,000 pounds of the liquid explosive nitormethane (NM) contained in a 36 inch diameter spun aluminum sphere. The purpose was to extend the knowledge of cratering with rows of charges in desert alluvium that had been gained from Project Pre-Buggy I. Both experimental series were intended to provide data to be used in the design of the Project Buggy nuclear row charge experiment of the Plowshare nuclear excavation research program.

19. Ordnance

AD-617 267 Div. 22/6, 22/4
CFSTI Prices: HC$3.00 MF$0.50

Ballistic Research Labs., Aberdeen Proving Ground, Md.
PENETRATION AND CRATER VOLUME IN VARIOUS KINDS OF ROCKS AS DEPENDENT ON CALIBER, MASS, AND STRIKING VELOCITY OF PROJECTILE,
by N. A. Tolch and A. V. Bushkovitch. 16 Oct 47, 52p Rept. no. 641
Proj. TB3 0112E TM2 9106

Unclassified report

Descriptors: (*Terminal ballistics, Rock(Geology)), (*Rock(Geology), Terminal ballistics), Fortifications, Vulnerability, Penetration, Cratering, Armor piercing ammunition, Projectiles, Firing tests(Ordnance), Explosion effects.

Firings of caliber .50, 20mm, and 37mm A.P. projectiles were made on 4' x 4' x 3' blocks of granite, diabase, quartzite, oolitic limestone, and sandstone. The results of firing major caliber projectiles on limestone at Fort Knox, Kentucky, were obtained from the Armored Board. From the results of the firings, relations were deduced giving the depth of penetration and volume of crater as dependent on the caliber, mass, and striking velocity of projectile. The observed penetrations were approximately inversely proportional to the cube roots of the compressive strengths of the rocks. Rock walls constructed of granite blocks were found to be inferior to massive monolithic granite due to the extensive spreading of cracks along the mortar bond. H.E. Type artillery shell with concrete piercing fuzes were observed to rupture on impact on a rock wall. Modified H.E. shell with thick cases, containing about 5% explosive, withstood impact on rock with deformation. (Author)

AD-617 278 Div. 22/4, 15/1
CFSTI Prices: HC$3.00 MF$0.75

New York Univ., N. Y.
TOPICS IN THE THEORY OF TRAJECTORIES FOR A PARTICLE,
Master's thesis,
by James Biscardi, Jr. Jun 65, 80p

Unclassified report

Descriptors: (*Exterior ballistics, Mathematical prediction), (*Trajectories, Particles), Differential equations, Motion, Bomb trajectories, Rocket trajectories.

AD-617 317 Div. 22/11, 30/1, 1/2
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE ANTECEDENTS OF THE X-1,
by Robert L. Perry. Jun 65, 38p
Rept. no. P-3154

Unclassified report

Prepared for presentation at the meeting of the American Institute of Aeronautics and Astronautics, San Francisco, Calif., 26-28 Jul 65.

Descriptors: (*Rocket planes, Research program administration), (*Research program administration, Rocket planes), Research planes, Transonic flight, Air Force research.

The development of rocket planes up to and including the X-1 is discussed.

AD-617 321 Div. 22/6, 20/2
CFSTI Prices: HC$2.00 MF$0.50

TRW Space Technology Labs., Redondo Bench, Calif.
SHOCK SPECTRUM MEASUREMENTS,
by Frank W. Galbraith and M. V. Barton. 2 Jul 65, 34p
Proj. 1 7
ARPA VUF-2401

Unclassified report

Rept. on Project Vela Uniform, Plowshare program, Project gnome.

Descriptors: (*Shock waves, Nuclear explosions), (*Underground explosions, Shock waves), Rock salt, Seismic waves, Attenuation.

A total of twelve reed gages were installed to measure displacement shock spectra resulting from the Project Gnome underground nuclear explosion. Seven of the gages were installed on the ground surface at four locations out to a distance of 3000 feet from surface zero. All of these gages yielded usable records. Four of the gages were installed in the floor of the Gnome tunnel at two locations. Those at the 1033-foot range gave valid records; those at the 900-foot range were not recovered after the test. The one gage located underground at the International Minerals and Chemical Corporation (IMCC) mine, some nine miles distant, did not record any motion. The plotted displacement spectra showed the expected results in that displacements and peak accelerations decreased with increasing slant range for the surface gages. The vertical spectra were higher than the corresponding horizontal radial spectra for the surface gages. For the gages in the Gnome tunnel, the horizontal radial spectrum was higher than the vertical spectrum. (Author)

AD-617 339 Div. 22/4
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A PROPOSED SCALING LAW FOR HYPERVELOCITY IMPACTS BETWEEN A PROJECTILE AND A TARGET OF DISSIMILAR MATERIAL,
by R. L. Bjork and A. E. Olshaker. May 65, 44p
Memo no. RM-2926-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Hypervelcity projectiles, Impact shock), (*Impact shock, Hypervelocity projectiles), Penetration, Targets, Graphics.

The initial particle velocity produced in a target struck by a hypervelocity projectile is taken to be a significant parameter in determining target penetration. It is found that one can fit a large body of experimental data by assuming that penetrations are linearly proportional to this velocity for projectiles of a given mass and velocity striking a given target. The relation is found to hold over the projectile-density range of 1.75 to 19.3 gm/cc. Using other hypervelocity scaling laws, the relation is extended to apply to projectiles of any dimension. Based on this relation, the scaling factors were calculated for nine metals and volcanic tuff over a wide velocity range, and the results are presented graphically.

AD-617 355 Div. 22/1, 17/7
CFSTI Prices: HC$2.00 MF$0.50

Remington Arms Co., Inc. Bridgeport, Conn.

DEVELOPMENT OF A 7.62mm WROUGHT ZINC ALLOY BLANK CARTRIDGE FOR USE IN THE M-14 RIFLE AND M-60 MACHINE GUN.
Final summary rept. for Apr 61-Apr 63,
by J. T. MacMillan. May 63, 40p
Rept. no. AB-63-4
Contract DA19 0200RD5233

Unclassified report

Descriptors: (*Cartridges, Zinc alloys), (*Zinc alloys, Cartridges), (*Small arms, Zinc alloys), Small arms, Automatic weapons, Mechanical working, Titanium alloys, Copper alloys, Manufacturing methods.

Work under the contract has shown that a blank cartridge can be produced from wrought zinc alloy which will function only in the M-14 rifle. Since the case does not have a bullet simulating extension it will not feed in the M-60 machine gun. Addition of a bullet simulating profile to the case causes neck and body splits to occur at low temperature firing. Investigation of various manufacturing variables has been unsuccessful in eliminating neck and body splits with this type case. Variations in raw material are considered to be the primary cause of varied good and bad results. A thorough investigation of raw material variables, not conducted under this contract, is a logical next step. Cartridges produced were manufactured on the type of equipment currently in use for the production of 7.62mm NATO ammunition. (Author)

AD-617 402 Div. 22/1, 22/8
CFSTI Prices: HC$2.00 MF$0.50

General Technology Corp., Elgin, Ill.
MODELS OF YIELDING IN THE VICINITY OF THE ROTATING BAND.
Technical rept.,
by R. C. Geldmacher and T. M. Roach, Jr. Sep 64, 46p Rept. no. TR-1-23
Contract DA11 022ORD2917 Unclassified report

Descriptors: (*Projectile cases, Compressive properties), (*Interior ballistics, Projectiles), Cylindrical bodies, Shear stresses, Strain(Mechanics), Deformation, Mathematical analysis, Ordnance, Ballistics.

While usually not intended, yielding during firing probably occurs in many shells on their interior surface in the vicinity of the rotating band. Nevertheless, except for instances where the accompanying deformation may cause a malfunction in an internally carried device, such yielding may be considered a part of 'good' design. The purpose of this investigation was to attempt to develop a foundation for procedures whereby the shell designer can: (1) predict post-yield deflections in shells in the region beneath the rotating band, and (2) determine, a priori, the magnitudes of rotating band pressures for a particular shell-band-gun system.

AD-617 422 Div. 22/7, 6/5, 8/4
CFSTI Prices: HC$1.00 MF$0.50

Holman (John F.) Co., Inc., Washington, D. C.
A PHOTOELECTRONIC TRACKING DEVICE,
by G. P. Katys, Yu. V. Strelnikov, and R. N. Blaut-Blachev. Jun 65, 8p
Contract DA44 099AMC930T
AERDL T-1786-65; TT 65-62563

Unclassified report

Fotoelektronnoe Sledyashchee Ustroistvo, trans. of Russian Patent 160 778, pub. in Byulleten Izobretenii i Tovarnykh Znakov (USSR) n5 p30 1964.

Descriptors: (*Optical tracking, Phototubes), (*Phototubes, Optical tracking), Photocathodes, Tracking, Light homing, Modulation, USSR.

A photoelectronic tracking device without rotating pairs, and in which a dissector tube is used as a sensitive element is proposed. In the absence of rotating mechanical elements, modulation is achieved by placing a round diaphragm in front of the dissector anode, in concentric relation to the axis of the projecting optical system and dissector. The electronic image of the tracked object can be seen moving in a circle within the plane of this diaphragm under the effect of the rotating magnetic field. The latter is produced by a stabilized source of alternating current which supplies two pairs of coils in the dissector transfer section with sinusoidal voltages of the same frequency, but 90 degrees out of phase in relation to each other. The operational principle of the proposed device and its possible designs are explained in the drawings.

AD-617 549 Div. 22/4, 22/1, 25/8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE ROLE OF MELTING AND VAPORIZATION IN HYPERVELOCITY IMPACT,
by R. L. Bjork and A. E. Olshaker. May 65, 33p
Memo. no. RM-3490-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Terminal ballistics, Thermodynamics), (*Melting, Impact shock), (*Vaporization, Impact shock), (*Impact shock, Thermodynamics), (*Cratering, Thermodynamics), Targets, Hypervelocity projectiles, Fluid dynamic properties, Metals, Vulnerability, Satellites(Artificial); Heat transfer, Tensile properties, Aluminum, Meteorites.

The memorandum discusses the thermodynamics associated with the flow processes in hypervelocity cratering. Qualitative, graphical arguments are presented to show that previously proposed thermal-impact theories, which postulate that the kinetic energy of impacting projectiles goes entirely into breaking of chemical bonds of fusion, considerably overestimate the transference of energy into heating. Work conducted on the evaluation of release temperatures and phases of nine metals as a function of shock strength is summarized, and similar information is estimated for ten additional metals. The data on release temperature as a function of maximum shock pressure provide a basis for calculating the threshold impact velocities of various projectiles that cause incipient and complete melting in the target material. The results indicate that a quantitative evaluation of the effects of heating in an impact process requires a detailed knowledge of the maximum shock pressures as a function of position within the target. (Author)

AD-617 892 Div. 22/4, 14/8, 17/6, 17/7
CFSTI Prices: HC$2.00 MF$0.50

Utah Research and Development Co., Salt Lake City.
THEORETICAL AND EXPERIMENTAL STUDY OF LOW VELOCITY PENETRATION PHENOMENA.
Semiannual rept., Phases 3, 4, and 5.
May 65, 28p
Contract DA19 129AMC150X, ARPA Order 267

Unclassified report

Descriptors: (*Materials, Deformation), (*Penetration, Disks), (*Plastics, Penetration), Toughness, Impact shock, Terminal ballistics, Copper, Aluminum,

Nylon, Halocarbon plastics, Polyester plastics, Polyethylene plastics.

A study of the strength of materials under large deformation was conducted. The sample to be tested was in the form of a thin disk and was crushed between a fixed and a moving anvil. Velocities ranging from 0.001 to 10,000 cm/sec were obtained by driving the anvil either by a testing machine or by a compressed-air gun. A simplified analysis of the problem is given, and the assumptions used are discussed and compared with the experimental data. The relationship between internal energy of the material and deformation is found to be $U = T \ln (z_0/z)$ where U is energy per unit mass, z_0 and z are initial and final thickness of the disk and T is a constant, the 'strength' of the material. Variations in T are discussed in terms of strain-rate effects and strain-hardening effects. The materials tested were copper, 99.99 per cent pure aluminum, 6061-T4 and -T6 aluminum, Nylon, Lexan, Teflon, polyethylene and polypropylene. (Author)

20. Physics

AD-617 225 Div. 25/3, 9/6

Cornell Univ., Ithaca, N. Y.
THE TRANSIENT HYDROMAGNETIC FLOW PAST AN AIRFOIL FOR AN ALIGNED MAGNETIC FIELD,
Technical rept.,
by S. Leibovich and G. S. S. Ludford. 14 Dec 64, 31p Rept. no. TR-8
Contract Nonr40146, Proj. NR061 125
Unclassified report

Pub. in Journal de Mecanique v4 n1 p21-50 Mar 1965 (Copies available only to DDC users).

Descriptors: (*Magnetohydrodynamics, Airfoils), Fluid flow, Magnetic fields, Nonequilibrium flow, Plasma medium, Field theory, Boundary value problems.

AD-617 226 Div. 20/2

Queen's Univ., Belfast (Northern Ireland). Dept. of Applied Mathematics.
DISSOCIATION OF HYDROGEN MOLECULAR IONS BY FAST PROTONS,
by D. R. Bates and A. R. Holt. 8 Dec 64, 13p
Contract N62558 3634
Unclassified report

Pub. in Proceedings of the Physical Society v85 p691-702 1965 (Copies available only to DDC users).

Descriptors: (*Proton bombardment, Hydrogen), (*Dissociation, Hydrogen), (*Hydrogen, Ions), Molecules, Inelastic scattering, Electron transitions, Integral transforms.

Inelastic collisions between H2(+) ions and fast protons are investigated. Using the Cohen-Coulson expansions for the electronic wave functions, calculations are carried out on the first Born approximation to the cross sections associated with transitions from the 1s sigma state to the 2p sigma, 2p pi, 2s sigma and 3d pi states with the internuclear distance held at its equilibrium value. Dissociation due to the interaction between the projectile and the nuclei of the target is treated classically. With the aid of results due to Peek cross sections are obtained for H(+)+H2(+)(1s sigma v, J) to H(+)+H(+)+H(1s) and for H(+)+H2(+)(1s sigma, v, J) to H(+)+H(+)+H(E) where E indicates any excited state (including the continuum). (Author)

AD-617 227 Div. 20/2

Illinois Univ., Urbana.
MOSSBAUER EVIDENCE FOR HIGHLY CHARGED STATES FOLLOWING CO57 ELECTRON CAPTURE IN HYDRATED COBALT COMPOUNDS,
by R. Ingalls and G. Depasquali. 9 Mar 65, 3p
Contracts Nonr183405, AT11 1 1198
Unclassified report

Pub. in Physics Letters v15 n3 p262-4 Apr 1 1965 (Copies available only to DDC users).

Descriptors: (*Electron capture, Cobalt), (*Mossbauer effect, Cobalt compounds), Hydrates, Nuclear isomers, Valence, Excitation.

AD-617 232 Div. 25/3

Electronics Research Lab., Univ. of California, Berkeley.
PROPAGATION AND INSTABILITIES OF WAVES IN BOUNDED FINITE TEMPERATURE PLASMAS,
by A. J. Lichtenberg and J. S. Jayson. 9 Jul 64, 7p
Grant AF AFOSR139 64
AFOSR 65-0912
Unclassified report

Pub. in Journal of Applied Physics v36 n2 p449-55 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Cyclotron waves, Propagation), (*Plasma medium, Cyclotron waves), Stability, Waveguides, Plasma oscillations, Damping, Scattering, Tensor analysis, Partial differential equation.

The quasistatic analysis is used to examine propagation and instabilities of waves in a plasma in which the transverse bounds and the temperature are important. A dispersion equation is derived by use of a dielectric tensor, which is correct within the quasistatic assumption and the assumption of longitudinal velocity, only. The dispersion curves have a smooth transition from the zero temperature case at long wavelengths to the unbounded finite temperature case at short wavelengths. The stop-bands which appear in the zero temperature analysis become propagating regions in the more general case. Landau-type damping is calculated; the cyclotron wave is strongly damped. The effect of the boundaries and the magnetic field on a double-humped velocity distribution is examined. The transverse boundaries are stabilizing with respect to space-charge waves, but the cyclotron interactions are strengthened. The temperature always exerts a stabilizing influence which is particularly marked for the interaction between the cyclotron waves. Curves of the limiting regions of stability, with respect to various parameters, are given, illustrating these effects. By the use of an example it is demonstrated that a moderate temperature can suppress the cyclotron instability. This result is in agreement with the experimental observation that a plasma, predicted to be unstable with respect to the cyclotron-wave interaction, was actually stable. (Author)

AD-617 233 Div. 25/4, 25/3

Electronics Research Lab., Univ. of California, Berkeley.
LASER-INDUCED EMISSION OF ELECTRONS, IONS, AND NEUTRALS FROM Ti AND Ti-D SURFACES,
by T. Y. Chang and C. K. Birdsall. 13 Aug 64, 2p
Grants AF AFOSR139 63, AF AFOSR139 64
AFOSR 65-0910
Unclassified report

Pub. in Applied Physics Letters v5 n9 p171-2 Nov 1 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lasers, Photoelectric effect), (*Photoelectric effect, Titanium), (*Plasma medium, Photoelectric effect), Electrons, Ions, Atoms, Deuterons, Deuterated compounds.

AD-617 234 Div. 25/3

Electronics Research Labs., Univ. of California, Berkeley.
SHEET-CURRENT PLASMA MODEL FOR ION-CYCLOTRON WAVES,

by Akira Hasegawa and Charles K. Birdsall.
28 Feb 64, 11p
Contracts AF33 657 7614, AF33 615 1078
AFOSR 65-0911

Unclassified report

Pub. in Physics of Fluids v7 n10 p1590-1600 Oct 1964
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Plasma medium, Electric currents), (*Cyclotron waves, Plasma medium), Ions, Stability, Plasma oscillations, Temperature, Cyclotron resonance phenomena, Magnetic fields.

An approximate plasma model, using current sheets, is introduced and initial results are presented. The primary utility is to obtain the nonlinear behavior of ion-cyclotron waves. Linear analysis is used to develop the bicircular particle motion, to show the coupling of the ion-cyclotron resonance for finite perpendicular T, to show Landau cyclotron damping for finite parallel T. The sheet model is developed in terms of vector potential A and sheet current density J for k parallel to the steady field B. There are transverse fields only, with sheet motion along three coordinates. The electrons are assumed to be hot, forming a neutralizing background. The model accuracy tests show a reasonable duplication of cold plasma ion waves. The first computer experiment shows wave damping for parallel T > perpendicular T at the rate expected from linear analysis, and with parallel T decreasing, perpendicular T increasing. The second computer experiment shows wave growth for perpendicular T > parallel T, at the rate expected, and with perpendicular T decreasing and parallel T increasing. The third computer experiment was to find the limit in perpendicular T for interaction with an electron stream; the nonlinear limit found is equal transverse energies, whereas linear analysis shows mass ratio smaller value. This result is encouraging for using this method for ion heating. (Author)

AD-617 236 Div. 20/2, 15/1

Washington Univ., St. Louis, Mo.
GROUND STATE AND LOW EXCITED STATES OF A BOSON LIQUID WITH APPLICATIONS TO THE CHARGED BOSON SYSTEM.
Revised ed.,
by Deok Kyo Lee and Eugene Feenberg. 9 Sep 64, 12p
Grants AF AFOSR62 412, NSF G22296
AFOSR 65-0812 Unclassified report

Pub. in Physical Review v137 n3A pA731-42 Feb 1 1965 (Copies not available to DDC or Clearinghouse customers). Revision of manuscript submitted 27 Apr 64.

Descriptors: (*Bosons, Excitation), (*Excitation, Bosons), (*Ground state, Bosons), Liquids, Potential theory, Hamiltonian, Energy, Integral transforms.

The maximum deviation of the radial distribution function from its asymptotic value is used as an expansion parameter in calculating the properties of a degenerate boson system. The uniform limit holds at low densities under appropriate constraints on the Fourier transforms of the interaction potential and also at high densities for the charged-boson system. In the uniform limit a procedure based on (1) a Jastrow-type trial function, (2) the Wu-Feenberg functional for the kinetic energy, (3) the Kirkwood superposition approximation, or the more accurate Abe form for the three-particle distribution function, yields the Bogoliubov formulas for the ground-state energy and the excitation energies of a degenerate or nearly degenerate boson system. Numerical results are also computed at intermediate and moderately low densities (0.01 < or = r < or = 100). (Author)

AD-617 239 Div. 20/2

Brandeis Univ., Waltham, Mass.
SPONTANEOUS SYMMETRY BREAKDOWN IN Muon-e ELECTRODYNAMICS,
by S. Deser and R. Arnowitt. 26 Oct 64, 3p
Grant AF AFOSR368 63, Proj. 9751, Task 975101
AFOSR 65-0818

Unclassified report

Pub. in Physics Letters v13 n3 p256-8 Dec 1 1964
(Copies available only to DDC users).

Descriptors: (*Meson reactions, Field theory), (*Muons, Electrons), Beta decay, Gamma emission, Parity.

The possibility is examined of spontaneous symmetry breakdowns in the electrodynamics of two originally identical charged fields with minimal coupling. The analysis provides a simple example of internal symmetry, SU(2), for which three possibilities arise: (1) no spontaneous breakdowns occur and the vacuum state possesses full SU(2) invariance; (2) a partial breakdown occurs which will be seen to produce a mass splitting out of muon to e+gamma-ray decay; and (3) full SU(2) breakdown occurs which will result, in general, in allowed muon to e+gamma-ray decay as well as mass splitting. Only minimal gauge invariant interactions are involved, and hence divergencies and cut off problems are avoided. (Author)

AD-617 242 Div. 25/2

Pennsylvania State Univ., University Park.
THE EFFECT OF POLARIZATION, FIELD STRESS, AND GAS IMPACT ON THE TOPOGRAPHY OF FIELD EVAPORATED SURFACES,
by E. W. Muller. 1964, 12p
Grant AF AFOSR62 96, Proj. 9761, Task 976103
AFOSR 65-0780

Unclassified report

Pub. in Surface Science v2 p484-94 1964.
(Copies available only to DDC users).

Descriptors: (*Field emission, Metals), (*Surface properties, Metallic crystals), (*Crystal lattice defects, Metallic crystals), Polarization, Stresses, Electron microscopy, Cryogenics, Metal films, Evaporation.

Field evaporation of pure metals can produce highly perfect surfaces. The field evaporation end form is established by balancing the local field at the evaporation site with the binding energy of the evaporating metal atom. A considerable part of this energy is due to polarization which can be described by field penetration rather than by the polarizability of the free atom. Polarization also stabilizes characteristic low-coordination sites. In several metals the field stress causes specific lattice defects. The field evaporation end form is further modified by the presence of the imaging gas when the molecules effectively transfer their dipole attraction energy in the collision with surface atoms. (Author)

AD-617 247 Div. 25/7
CFSTI Prices: HC$1.00 MF$0.50

Weizmann Inst. of Science, Rehovoth (Israel).
RESEARCH ON MEASUREMENT OF PRESSURE INDUCED SHIFTS OF ABSORPTION LINES IN THE INFRARED SPECTRUM.
Summary rept. no. 4, 1 Jan-30 Jun 64,
by J. H. Jaffe. Oct 64, 6p
Contract AF61 052 388

AFCRL 65-108

Unclassified report

Descriptors: (*Spectra(Infrared), Pressure), (*Molecular spectroscopy, Spectra(Infrared)), Infrared spectroscopy, Absorption spectrum, Line spectrum.

Infrared spectroscopy research is summarized for the following areas: Determination of line strengths and widths in molecular spectra at normal and elevated temperatures; Determination of line strengths and widths in molecular spectra by measurement of optical dispersion; Determination of pressure induced shifts of individual lines at normal and elevated temperatures; Theoretical investigations complementing the experimental work.

AD-617 250 Div. 25/4, 30/3, 25/7
CFSTI Prices: HC$1.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
VACUUM ULTRAVIOLET LIGHT SOURCES: NEW EXCITATION UNIT FOR THE RARE GAS CONTINUA. Instrumentation papers,
by R. E. Huffman, J. C. Larrabee, and Derek Chambers.
Jun 65, 24p Rept. nos. AFCRL65-381; IP-65
Proj. 8627, Task 862701

Unclassified report

Research supported in part by Contract AF19(628)2380 with Brower Labs., Inc., Westboro, Mass.

Descriptors: (*Ultraviolet radiation, Sources), (*Helium group gases, Excitation), (*Continuous spectrum, Helium group gases), Gas discharges, Discharge tubes, Thyratrons, Modulators, Monochromatic light, Bandwidth, Ultraviolet spectroscopy, Helium, Argon, Krypton, Xenon, Hydrogen.

Experimental details are presented of an excitation unit developed for use in producing the rare gas continua in helium, argon, krypton, and xenon. The unit is essentially a thyratron-controlled modulator which replaces the spark-gap external trigger in a conventional spectroscopic 'condensed discharge'. With this unit, it is possible to obtain the Hopfield helium continuum in the 580 to 1100A wave-length region with improved intensity and stability so that an improved bandwidth of slightly less than 0.25A is obtained with a 2.2 m normal-incidence vacuum monochromator and photoelectric scanning detection. This excitation unit is described, and its application to study of the rare gas continua and to absorption cross-section measurements in hydrogen is illustrated. (Author)

AD-617 258 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Dept. of Aeronautics and Astronautics.
SINGULAR-PERTURBATION METHODS APPLIED TO MAGNETO-GASDYNAMICS AND PLASMA PROBLEMS. Final rept.,
by I-Dee Chang. 24 Jun 65, 9p
Grant DA ARO D31 124G457, Proj. 4284E
AROD 4284:3

Unclassified report

Descriptors: (*Magnetohydrodynamics, Perturbation theory), (*Fluid dynamic properties, Magnetic fields), Plasma physics, Compressible flow, Turbulence, Magnetic properties, Viscosity, Spheres, Vortices.

A review is given of research on the following topics: (a) the magnetic effect on boundary layer separation, (b) statistical theory of homogeneous hydromagnetic turbulence, and (c) slow motion of a sphere in a compressible viscous fluid.

AD-617 269 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

Aeroelastic and Structures Research Lab., Mass. Inst. of Tech., Cambridge.
VIBRATIONS OF FREELY-SUPPORTED ORTHOTROPIC CYLINDRICAL SHELLS UNDER INTERNAL PRESSURE,
by Peter R. DiGiovanii and John Dugundji.
Feb 65, 78p Rept. no. ASRL-TR-112-4
Grant AF AFOSR62 363
AFOSR 65-0640

Unclassified report

Descriptors: (*Elastic shells, Vibration), (*Stiffened cylinders, Elastic shells), Elasticity, Differential equations, Pressure, Cylindrical bodies.

The influence of orthotropicity and internal pressure on the natural frequencies of a thin cylindrical shell whose ends are freely supported is found using the shell equations of Washizu. Other common shell theories are also presented. Calculations are performed for four constant thickness orthotropic cylinders, two stiffened cylinders, and a basic isotropic cylinder. For these calculations, only the special cases of axial and circumferential stiffening were considered.

AD-617 308 Div. 25/6, 9/6, 30/2
CFSTI Prices: HC$4.00 MF$0.75

Aeroelastic and Structures Research Lab., Mass. Inst. of Tech., Cambridge.
SABOR III: A FORTRAN PROGRAM FOR THE LINEAR ELASTIC ANALYSIS OF THIN SHELLS OF REVOLUTION UNDER AXISYMMETRIC LOADING BY USING THE MATRIX DISPLACEMENT METHOD,
by John H. Percy, Dhirendra R. Navaratna, and Stanley Klein. May 65, 103p
Rept. no. ASRL-TR-121-6
Contract AF04 694 427

Unclassified report

Descriptors: (*Programming languages, Elasticity), (*Structural shells, Loading(Mechanics)), (*Bodies of revolution, Loading(Mechanics)), Aerodynamic loading, Linear systems, Matrix algebra, Structures, Harmonic analysis.

A FORTRAN II program, termed SABOR III, for the matrix-displacement finite-element method of analysis of thin shells of revolution subjected to asymmetric or axisymmetric loading is presented. Included are descriptions of the structural idealization and the program. A complete FORTRAN listing of SABOR III is given together with the program flow diagram and input and output instructions. The complete results for two example problems are listed to enable the user to check the adaptation of the computer program to his facility. (Author)

AD-617 328 Div. 8/6

Air Force Cambridge Research Labs., Bedford, Mass.
WAVEFORMS AND RELATIVE PHASE STABILITY OF TRANSIENTS RADIATED FROM A HELICOPTER-SUPPORTED ANTENNA WIRE.
Physical sciences research papers,
by E. A. Lewis, J. E. Rasmussen, and J. R. Stahmann.

24 Sep 64, 12p Rept. nos. AFCRL 65-394, PSRP-108
Proj. 4662, Task 466205
Unclassified report

Pub. in IEEE Transactions on Antennas and Propagation vAP-13 n2 p257-61 Mar 1965 (Copies not available to DDC or Clearinghouse customers) Revision of manuscript submitted 27 Aug 63.

Descriptors: (*Dipole antennas, Wave transmission), (*Wave transmission, Antennas), Phase(Electronics), Stability, Radiofrequency power, Very low frequency, Propagation, Antenna radiation patterns, Atmospherics, Electromagnetic fields, Electromagnetic pulses.

A nearly vertical antenna wire varying in length from 3000 to 8000 ft was shock-excited by a high-voltage source. The resulting radiation fields were received at distances of about 600 km by two stations separated laterally so as to subtend an angle of about 15 at the source. The difference in wavefront arrival times at the two stations, observed for 101 transmissions, showed an average absolute deviation from the mean of about only 1/2 microns. This figure includes the effects of possible source asymmetries, sferics noise, instrumental errors, and wave propagation. Typical oscillograms of antenna currents and radiation fields are given. It is shown that the amplitudes and durations of the pulse envelopes, the amplitudes and durations of the first half-cycles, and the quasi-frequencies of the pulses are in good agreement with a theory that takes energy losses into account. (Author)

AD-617 329 Div. 25/8
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
BOUNDS IN MELTING PROBLEMS WITH ARBITRARY RATES OF LIQUID REMOVAL.
Technical rept.,
by Ting-Shu Wu and Bruno A. Boley. Apr 64, 46p
Rept. nos. CU-24-64, TR-24
Contract Nonr26620, Proj. NR064 401
Unclassified report

Descriptors: (*Melting, Ablation), (*Ablation, Melting), Thermal conductivity, Boundary value problems, Heat transfer, Phase studies.

A slab, whose material properties are dependent on both temperature and position, is insulated on one face and heated on the other according to either prescribed heat flux or temperature, so that eventually it begins to melt. After melting has started, a portion of the molten material is instantaneously removed at some prescribed rate. It is shown that the solution of this melting problem is unique, and that, under certain conditions, larger rates of heating and/or ablation result in larger rates of melting and in higher temperatures. In order to arrive at these results just stated, it is first necessary to extend the strong maximum principle for parabolic differential equations to the pertinent nonlinear case, and to prove a uniqueness theorem and a comparison theorem for the nonlinear Fourier heat-conduction equation under various boundary conditions. (Author)

AD-617 330 Div. 25/8
CFSTI Prices: HC$3.00 MF$0.75

Institute of Flight Structures, Columbia Univ., New York.
THE SOLUTION OF A CLASS OF TWO-DIMENSIONAL MELTING AND SOLIDIFICATION PROBLEMS.
Technical rept.,
by David L. Sikarskie and Bruno A. Boley. May 64, 73p Rept. nos. CU-25-64, TR-25
Contract Nonr26620, Proj. NR064 401
Unclassified report

Descriptors: (*Melting, Ablation), (*Crystallization, Cooling), Phase studies, Heat transfer, Thermal conductivity, Differential equations, Integral equations.

Two-dimensional melting and solidification problems are divided into three convenient classes and a general method of solution for one of these is presented. The concept is used of a fictitious body of constant geometry, in which is embedded the real body (whose dimensions are changing due to the change in phase); the fictitious body is acted upon by a fictitious heat flux or (in some problems) a fictitious initial temperature distribution. A set of integro-differential equations is presented to be solved simultaneously, numerically or in series form. The melting of a finite, insulated slab with the melt immediately removed is formulated and an example for a semi-infinite, insulated strip is given. The solidification of a finite insulated slab with zero superheat is formulated and an example for a specific cooling history is given. Two-dimensional effects are introduced by spatial variations of heating or cooling conditions, and short-time series solutions are developed. (Author)

AD-617 341 Div. 25/6, 13/4
CFSTI Prices: HC$2.00 MF$0.50

TRG, Inc., Melville, N. Y.
EXPERIMENTAL STUDY OF MECHANICAL RESONATORS ATTACHED TO BARS.
Technical note,
by David Yarmush and Samuel Aronson. May 64, 39p Rept. no. TRG-142-TN-64-11
Contract Nonr320800
Unclassified report

Descriptors: (*Vibrators(Mechanical), Resonance), Prismatic bodies, Rods, Vibration isolators, Wave transmission, Mechanical waves, Accelerometers, Mechanical drawings, Graphics.

Mechanical elements, resonant at chosen frequencies, were attached at their nodal point to prismatic bars. The response of the bars to various vibrational inputs were studied. It was found that these elements tend to suppress the response of the bars in the vicinity of the resonant frequency. When several elements were placed on the bar, the total effect in specific geometries was stronger than the sum of the individual effects, and the frequency stop-band was broadened. (Author)

AD-617 342 Div. 25/4, 8/2
CFSTI Prices: HC$2.00 MF$0.50

Varian Associates, Beverly, Mass.
HYDROGEN MASER PROGRAM.
Interim technical rept. for 1 Jul 63-27 Mar 64,
by Jacques Vanier. 10 Jun 65, 40p
Contract Nonr357000, Proj. NR373 690
Unclassified report

See also AD-422 859.

Descriptors: (*Masers, Hydrogen), (*Hydrogen, Masers), Cavity resonators, Glass, Spheres, Plastic coatings, Atomic energy levels, Frequency shift, Atoms, Electromagnetic fields, Recombination reactions, Quantum mechanics.

The work described in this report is part of a long range research and development program for advancing

the art of the hydrogen maser. The emphasis of the project is upon research in the characteristics of the storage bulb of the maser. Particular attention is given to wall relaxation and wall shift. Other topics include exchange interactions and maser tuning techniques.

AD-617 343 Div. 25/4, 6/5
CFSTI Prices: HC$2.00 MF$0.50

Hughes Aircraft Co., Culver City, Calif.
CONTINUOUSLY PULSED LASER DEVICE FOR SURVEILLANCE.
Quarterly rept. no. 3, 1 Jan-31 Mar 65,
by Eric J. Woodbury. 31 Mar 65, 28p
Contract DA28 043AMC00326E, Proj. 1P6 22001A056
Unclassified report

See also AD-614 445.

Descriptors: (*Lasers, Space surveillance systems), Neodymium compounds, Yttrium compounds, Argon compounds, Garnets, Single crystals, Pumping(Electronics), Xenon lamps, Tungsten, Flash lamps, Oscillators.

As pointed out in the second quarterly report, work on this contract has been reduced to caretaker status pending improvement in Nd:YAG crystals. In the meantime, Hughes Aircraft Company, under Company sponsorship, has been investigating the tradeoffs between tungsten lamps and xenon flashlamps as pumps for pulsed Nd:YAG lasers. The results obtained so far are given in some detail in this report and indicate that below 6 kc repetition rate, flashlamps are superior to tungsten lamps while above 6 kc repetition rate the reverse is true. The actual cross-over region is not sharply defined so that from 3 kc to 8 kc repetition rate other system considerations could force the choice of one or the other types of lamps. (Author)

AD-617 357 Div. 20/1
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
EXCITATION OF ISOMERIC STATES IN Rh103 AND In115 BY ELECTRONS.
Revised ed.,
by P. Kruger, T. M. Crawford, J. Goldemberg, and W. C. Barber. Jul 64, 22p Rept. no. HEPL-314
Contract Nonr22567, Proj. NR022 026

Unclassified report

Manuscript of rept. pub. in Nuclear Physics v62 n4 p584-9 (AD-616 012, available only to DDC users).

Descriptors: (*Isomeric transitions, Excitation), (*Electron bombardment, Excitation), (*Rhodium, Isomeric transitions), (*Indium, Isomeric transitions), Nuclear isomers, Gamma-ray absorption coefficients, Technetium.

Yields for the production of the 57-minute isomeric state of Rh103 and for the 4.5 hour state of In115 were measured both for electrons and photons of energies between 7 and 18 MeV. The electrons were produced by the Stanford Mark II Linear Accelerator, and the irradiations were made with the 'stacked foil' method. The sensitivity of the electron/photon yield ratio to the multipole character of the reaction was used to obtain information on the absorption process of gamma-rays. The results for Rh103 lie somewhat lower than, but approximately parallel to, the theoretical results expected for electric dipole absorption. This type of result has been observed previously where electric dipole absorption is the dominating mechanism. The results for In115, on the contrary, are more than a factor of two higher than expected for dipole absorption, indicating that quadrupole or higher multipole transitions have a dominating role. In the course of the experiment the reaction Rh103 (gamma-ray 2p)Tc101 was observed. The cross section for this reaction is about three orders of magnitude smaller than that for the (gamma, gamma) reaction. (Author)

AD-617 358 Div. 20/2
CFSTI Prices: HC$1.00 MF$0.50

High Energy Physics Lab., Stanford Univ., Calif.
VARIATION OF BREMSSTRAHLUNG INTENSITY WITH ANGLE NEAR THE HIGH ENERGY END OF THE SPECTRUM,
by R. Zdarko, D. Drickey, and R. Mozley. Jul 64, 21p Rept. no. HEPL-337

Unclassified report

Descriptors: (*Bremsstrahlung, Nuclear spectroscopy), Photonuclear reactions, Photons, Intensity.

The relative intensity of thin target bremsstrahlung was measured as a function of bremstrahlung angle at the high energy end of the spectrum in the angular range from 0.0 to 3.0 mc sq/E for peak energies of E = 375 and 550 MeV. (Author)

AD-617 361 Div. 8/6
CFSTI Prices: HC$2.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
COMPARISON OF HF PROPAGATION PREDICTIONS AND OBLIQUE-INCIDENCE SOUNDER OBSERVATIONS ON THE OKINAWA/OAHU CIRCUIT.
Interim rept. no. 2,
by Richard R. Bartholomew. Dec 64, 34p
Contract DA28 043AMC00082E, Proj. 4980

Unclassified report

Descriptors: (*High frequency, Radio transmission), (*Ionospheric propagation, High frequency), Hawaii, Ryukyu islands, Atmospheric sounding, Radiosondes.

The propagating frequencies predicted by the United States Army Signal Radio Propagation Agency (RPA) for the Okinawa/Oahu trunk are compared with frequencies observed by an oblique-incidence sounder circuit paralleling the communication trunk. Predictions derived from the world-wide frequency predictions made by the National Bureau of Standards Central Radio Propagation Laboratory (CRPL) are also compared with the sounder-observed frequencies. The predicted maximum usable frequency (MUF) is compared with the monthly median of the observations for three months, and the predicted lowest usable frequency (LUF) is compared with the monthly median of the observations for two months. The observations on the Controllers Data Display (CDD) are compared with observations on film records and found to be in good agreement. It is shown that neither the RPA or the CRPL MUF predictions truly represent median conditions on this trunk. The MUF is higher than almost 80 percent of the observations; the FOT (0.85 MUF) exceeds the median of the observations for 56 percent of the time. The LUF predictions are found to be representative of median conditions but with a slight tendency to be higher than the observations. (Author)

AD-617 362 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

Rutgers - The State Univ., New Brunswick, N. J.

PROPERTIES OF SUPERCONDUCTING ALLOYS CONTAINING PARAMAGNETIC IMPURITIES,
by S. Skalski, O. Betbeder-Matibet, and P. R. Weiss.
1964, 69p

Unclassified report

Research supported by National Science Foundation and Office of Naval Research, Washington, D. C.

Descriptors: (*Superconductors, Transport properties), Paramagnetic materials, Impurities, Alloys, Electromagnetic properties, Thermal properties, Tunneling-(Electronics), Transition temperature, Atomic energy levels, Specific heat, Green's function, Field theory.

Calculations were made on the effects of paramagnetic impurities in superconductors using the Abrikosov-Gor'kov theory as our starting point and taking full advantage of the information contained in the Green's function of the system. The density of states in energy was computed for different values of the inverse collision time for exchange scattering. These calculations show clearly that the essential feature of superconductivity is the correlation of the electrons rather than the existence of a gap in the excitation energy spectrum. For even in the absence of a gap, so long as correlations persist there is an ordered state below a certain critical temperature which displays the usual properties of a superconductor.

AD-617 370 Div. 25/6
CFSTI Prices: HC$2.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.
THE CRITICAL MAGNETIC FIELD OF A THIN FILM OF SUPERCONDUCTOR,
by G. Rickayzen. Aug 64, 31p
Contract Nonr40138

Unclassified report

Manuscript of rept. pub. in the Physical Review v138 n1A pA73-8 Apr 64 (AD-615 850, not available to DDC or Clearinghouse customers).

Descriptors: (*Superconductors, Magnetic fields), (*Magnetic fields, Superconductors), (*Films, Superconductivity), Transition temperature, Cryogenics, Field theory.

A theory of the critical field of a thin superconductive film is given based on the assumption that this is the field in which the normal state becomes unstable to the formation of Cooper pairs. Only the case where the mean free path for the electrons is much less than the thickness of the film is discussed. The resulting field for temperatures near T sub c agrees with that predicted by the Ginzburg-Landau theory. At lower temperatures the field is greater than that predicted by an earlier theory of Maki and appears to be in better agreement with the experimental results. (Author)

AD-617 372 Div. 20/2, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana. Dept. of Physics.
SOLID STATE AND NUCLEAR RESULTS FROM MOSSBAUER STUDIES WITH I129,
by D. W. Hafemeister, G. DePasquali, and H. deWaard.
1964, 54p
Contract AF49 638 1048
AFOSR 65-0772

Unclassified report

Manuscript of rept. pub. in Physical Review v135 n5B pB1089-1101 Sep 7 1964 (AD-616 037 not available to DDC or Clearinghouse customers).

Descriptors: (*Mossbauer effect, Iodine), (*Nuclear properties, Iodine), (*Solid state physics, Iodine), Isomeric transitions, Nuclear electric moments, Valence, Crystal structure, Alkali metal compounds, Iodides.

The Mossbauer effect of the 26.8 keV transition in I129 was studied in a number of compounds. The isomeric shifts for the alkali iodides were found to be linearly dependent on the number of 5p holes in the iodine ion. A relative change of nuclear radius =0.00003 is computed. The isomeric shifts for some iodates indicate that their 5s-electron density is about 18% larger than that of the iodides. The quadrupole splitting of KIO3 was used to determine the I129 quadrupole ratio.

AD-617 383 Div. 25/3, 25/8
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., Philadelphia, Pa. Missile and Space Div.
NON-EQUILIBRIUM RADIATION,
Technical information series (revised ed.),
by J. L. Kulander. Jun 65, 123p
Rept. no. R64SD41

Unclassified report

Revision of rept. dated Jun 64, AD-605 827.

Descriptors: (*Plasma medium, Thermodynamics), Gases, Kinetic theory, Atomic energy levels, Resonance absorption, Relaxation time, Excitation, Electromagnetic waves, Statistical functions, Tables.

The criteria specifying the conditions for which a gas will be in a state of local thermodynamic equilibrium are discussed for both collisionally and radiatively controlled transition processes. Particular emphasis is given to the radiation field in a gas where the particle translational distribution functions are Maxwellian. A microscopic formulation of the transfer equation and solution for the source function is presented for a general n level atom where the first resonance line is optically non-thin. Specific solutions are given for a 3-level atomic model. The calculation of the radiative and collisional cross-sections and transition rates is discussed. The bound-bound and bound-free rates are calculated for the lower lying states of N I-VII assuming equilibrium distribution functions for temperatures between 10,000 and 1,000,000 K. The electron densities and temperatures for which the various collisional and radiative rates are balanced are presented as an indication of situations where the gas (N) will not be in a state of local thermodynamic equilibrium. (Author)

AD-617 386 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Plasma Physics Research Lab., Univ. of Minnesota, Minneapolis.
STUDY OF COLLISION PROCESSES IN GASEOUS PLASMAS.
Semi-annual technical rept. no. 4.
Jul 65, 13p
Contract Nonr71037

Unclassified report

See also AD-614 923.

Descriptors: (*Plasma medium, Test methods), Helium, Ions, Diffusion, Mass spectrum, Line spectrum, Band spectrum, Recombination reactions, Emissivity, Test equipment, Diatomic molecules, Helium group gases.

A summary is given of results with respect to the ambipolar diffusion coefficient of He(+) and He2(+) as obtained from mass spectrometer measurements. The

studies related to the time dependence of the intensity of spectral lines and bands strongly indicated that the light emitted during the plasma decay period is not due to two-body recombination processes but is caused by processes involving three particles. Modifications are indicated which are necessary in the SLEAMA II system in order to obtain a stronger ion signal. Recent results of mass spectrometric studies of diatomic molecular ions are summarized, as is progress in the satisfactory construction of the Mobility-Mass Identification Tube.

AD-617 397 Div. 25/4, 8/6
CFSTI Prices: HC$2.00 MF$0.50

Martin Co., Orlando, Fla.
EXCITATION AND DETECTION TECHNIQUES FOR MILLIMETER WAVE TRANSITIONS.
Quarterly progress rept. no. 11, 1 Jan-1 Apr 65,
by J. J. Gallagher, R. G. Strauch, and R. E. Cupp.
Jun 65, 33p Rept. no. OR-3796
Contract DA36 039SC90753, Proj. 1P6 22001A056
Unclassified report

Descriptors: (*Molecular beams, Millimeter waves), (*Millimeter waves, Molecular beams), Excitation, Detection, Resonance, Interferometers, Electron bombardment, Electron transitions, Spectrum analyzers, Hydrogen compounds, Sulfides, Frequency, Standards.

Ramsey patterns were observed for the 168.7 Gc lines of hydrogen sulfide for the first time. A pair of interferometers separated by 10 inches was used for the Ramsey excitation. Linewidths on the order of 930 cps, equivalent to 43 at X-band, were attained. The effects of several sources of line broadening were observed and are discussed. (Author)

AD-617 398 Div. 20/2
CFSTI Prices: HC$3.00 MF$0.75

Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
MU CAPTURE IN OXYGEN.
Doctoral thesis,
by R. C. Cohen. Apr 65, 80p
Rept. nos. CU-236; NEVIS-130
Contract Nonr26672
Unclassified report

Descriptors: (*Muons, Meson capture), (*Meson capture, Oxygen), Excitation, Neutrinos, Beta decay, Least squares method, Hamiltonian.

By measuring the muon induced N16 Beta-radioactivity and the low energy gamma-transitions in this nucleus, estimates have been obtained of the absolute capture rates for negative muons stopping in oxygen and producing N16 in three of the lowest lying states. The results are: muon(-) + O16 (O+) to N16 (2(-), ground state) + neutrino = 6,300 ± 700/sec to N16* (O(-), 120 keV) + neutrino = 1,100 ± 200/sec to N16* (1(-), 392 keV) + neutrino 1,730 ± 100/sec. Within the limits noted in the text, the rate to the O(-) state indicates the value for the pseudoscalar coupling constant lies between 10g sub A and 26g sub A. (Author)

AD-617 403 Div. 8/5, 15/1
CFSTI Prices: HC$2.00 MF$0.50

Northeastern Univ., Boston, Mass.
PULSE SHAPING BY MANIPULATING TRANSFORM ZEROS.
Scientific rept.,
by Jane B. Campbell, Sze-Hou Chang, Denis W. Fermental, and Nelson T. Tsao-Wu. 29 Dec 64, 48p
Rept. no. SR-1
Contract AF19 628 3312, Proj. 4610, Task 461003
AFCRL 65-20
Unclassified report

Descriptors: (*Electromagnetic pulses, Integral transforms), Fourier analysis, Complex variables, Wave form generators.

The Fourier transform of a pulse, a time-limited function of bounded amplitude, is characterized by an infinite set of zeros in the complex frequency plane. The possibility of a transform zero canceling a system function pole, was used by Gerst and Diamond to design signal inputs to a system to yield pulse outputs for the elimination of intersymbol interference. Gerst and Diamond also pointed to the value of differentiable pulses as design tools. The feasibility of shifting complex zeros to their conjugate positions in the frequency plane, was used by Hofstetter and Walther to find a set of pulses with an identical autocorrelation function. This paper reviews certain transform properties, and explores operations on transform zeros for the purpose of pulse shaping. In particular, zero manipulations for the following purposes are discussed. (1) By removing transform zeros, a pulse is shaped to have more derivatives. The zero removal process is extended to yield an infinitely-differentiable pulse. (2) By zero deletion and shifting, a pulse is made to approximate a chosen waveform. (3) By zero deletion and shifting, a pulse is shaped to have: (a) a specified amplitude density spectrum (e.g., rectangular-pulse-like); or (b) a specified energy density spectrum (e.g., complementary to 'colored' noise of the 1/f type). (Author)

AD-617 407 Div. 25/6
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
ON THE MAXIMUM THERMOELASTIC STRESS AND DEFLECTION IN A BEAM OR PLATE.
Technical rept.,
by Bruno A. Boley. Jan 65, 27p
Rept. nos. TR-27; CU-27-65-ONR-4259(07)-CE
Contract Nonr425907, Proj. NR064 401
Unclassified report

Descriptors: (*Thermal stresses, Structural parts), (*Structural parts, Deflection), Beams(Structural), Retangular bodies, Elasticity, Mathematical analysis.

It is shown in this paper that the thermal stress in a beam or plate cannot exceed the value k alpha E delta T, where delta T is the maximum instantaneous temperature excursion in a cross-section, and k is a coefficient dependent on the shape of the cross-section. A simple general formula for k is found, and results for several special cases of practical interest are given. For rectangular beams (suitably oriented) and for plates, for example, k = 4/3. For any section, k = 1 if the thermal moment is zero; simplifications also occur if the thermal force is zero. The corresponding results for beam deflections are also carried out.

AD-617 426 Div. 25/4

Air Force Cambridge Research Labs., Bedford, Mass.
PHOTOELECTRIC YIELDS FOR OBLIQUE INCIDENCE OF EXTREME ULTRAVIOLET RADIATION.
Physical sciences research papers,
by L. Heroux, J. E. Manson, H. E. Hinteregger, and W. J. McMahon. 27 Jul 64, 12p

Rept. no. PSRP-100, AFCRL 65-344
Proj. 6688, Task 668801

Unclassified report

Pub. in Optical Society of America, Journal v55 n1 p103-4 Jan 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Photoelectric effect, Ultraviolet radiation), (*Ultraviolet radiation, Photoelectric effect), Cathodes.

The dependence of the photoelectric yield of a tungsten cathode and a resistance strip cathode from a Bendix multiplier on the angle of illumination was investigated for several wavelengths between 304 A and 1216 A. The angle of incidence x, measured from the normal, was varied between 0 and 60 deg. For 304 A radiation, the dependence of the yield on the angle of incidence follows a sec x relationship. The yield rises less rapidly than sec x for 584 A illumination, and is nearly independent of the angle of illumination for 1216 A. (Author)

AD-617 433 Div. 25/6, 15/1

Illinois Univ., Urbana. Dept. of Physics.
SELF-CONSISTENT APPROXIMATIONS IN MANY-BODY SYSTEMS,
by Michael Revzen. 28 Jul 64, 4p
Grant DA AROD31 124G340
AROD 431:63

Unclassified report

Pub. in Journal of Mathematical Physics v6 n3 p450-3 Mar 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*N-body problem, Potential theory), (*Statistical mechanics, Numerical methods and procedures), Green's function, Field theory.

Baym's definition of a self-consistent approximation is rephrased in a more diagrammatic way and compared with formulations of the exact many-body problem of Balian, Bloch, and DeDominicis. It is shown that many of the results of these authors are valid for any self-consistent approximation as defined by Baym. (Author)

AD-617 434 Div. 20/1

Nevis Labs., Columbia Univ., Irvington-on-Hudson, N. Y.
MEASUREMENT OF THE MOMENTUM SPECTRUM OF POSITRONS FROM MUON DECAY,
by Marcel Bardon, Peter Norton, John Peoples, Allan M. Sachs and Juliet Lee-Franzini. 16 Feb 65, 6p
Rept. no. R-478
Contract Nonr26672

Unclassified report

Pub. in Physical Review Letters v14 n12 p449-53 Mar 22 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Positrons, Momentum), (*Muons, Meson reactions), Neutrinos, Particle trajectories, Spectrum analyzers.

AD-617 437 Div. 20/1

California Inst. of Tech., Pasadena.
REORIENTATION EFFECT IN CD114,
by J. de Boer, R. G. Stokstad, G. D. Symons, and A. Winther. 19 Feb 65, 5p
Contracts Nonr22047, AT04 3 63

Unclassified report

Pub. in Physical Review Letters v14 n14 p564-7 Apr 5 1965
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nuclear energy levels, Cadmium), (*Cadmium, Nuclear energy levels), Nuclear moments, Excitation.

The experimental determination of the reorientation effect in Cd114 by an evaluation of the measured cross sections for the scattering of O16 and He4 ions in terms of Q2+, the quadrupole moment of the first 2(+) state is described.

AD-617 439 Div. 25/5

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
THE LIMITING AMPLITUDE PRINCIPLE FOR ARBITRARY FINITE BODIES,
by Cathleen S. Morawetz. Aug 64, 6p
Contract DA31 124AROD204
AROD 247:65

Unclassified report

Pub. in Communications on Pure and Applied Mathematics v18 n1/2 p183-9 Feb/May 1965.
Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Boundary value problems, Quantum mechanics), (*Quantum mechanics, Harmonic analysis), Partial differential equations, Motion.

AD-617 440 Div. 25/3

Air Force Avionics Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
PROBE MEASUREMENTS THROUGH A DOUBLE LAYER.
Technical rept.,
by G. Medicus. 5 Jun 64, 10p
Rept. no. AL-TR-65-116
Proj. 4152

Unclassified report

Pub. in Journal of Applied Physics v36 n2 p435-42 Feb 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electrical double layer, Probes(Electromagnetic)), (*Probes(Electromagnetic), Electrical double layer), Plasma medium, Gas ionization, Electrons, Density, Cathodes, Oxides, Neon, Partial differential equations.

Probe curves and their second derivatives are automatically plotted for a small spherical probe going through a double layer (DL) at the opening of a hollow hot oxide cathode in a discharge in pure Ne of about 1 Torr. The cathode emission electrons are accelerated toward the DL in its fringe fields. Between cathode surface and DL, the electrons behave approximately according to the 'accelerated half-Maxwellian'; in the DL they are accelerated to energies equivalent to the metastable Ne levels near 16.5 V. A region of strong excitation and ionization ('ball of fire') froms just outside the cathode opening. The cathode emission electrons enter the ball of fire as a (fast group,) superimposed on the approximately Maxwellian slow group of the ball of fire plasma. The development of potential, density, and e spectrum is discussed. (Author)

AD-617 448 Div. 25/2

Iowa State Univ., Iowa City. Dept. of Chemistry.
THE REFINEMENT OF THE CRYSTAL STRUCTURE OF NORBORNADIENE PALLADIUM CHLORIDE.
Revised ed.,
by N. C. Baenziger, G. F. Richards, and J. R. Doyle.
12 Aug 64, 3p
AROD 3072:9

Unclassified report

Pub. in Acta Crystallographica v18 pt5 p924-6 1965(Copies available only to DDC users).

Descriptors: (*Crystal structure, Chlorides), (*Chlorides, Palladium compounds), (*Palladium compounds, Terpenes), Metalorganic compounds, Cryogenics, Symmetry(Crystallography).

The crystal structure of norbornadiene palladium chloride has been refined with data obtained by counter methods from crystals maintained at liquid nitrogen temperature. After refinement the conventional discrepancy index R=0.0275. The carbon-carbon single bond distances in the norbornadiene molecule are normal: 1.547, 1.552, 1.554 (±0.006) A; the double bond distances are barely significantly longer than normal: 1.366, 1.366 (±0.010) A. The observed double bond distance is now compatible with the infrared spectrum of the complexed olefin. (Author)

AD-617 452 Div. 25/3

Microwave Electronics Corp., Palo Alto, Calif.
PROPAGATION, DISPERSION, AND ATTENUATION OF BACKWARD-TRAVELING MAGNETOSTATIC WAVES IN YIG,
by F. A. Olson and J. R. Yaeger. 3 Jun 64, 3p
Contract AF49 638 1330
AFOSR 65-0898

Unclassified report

Pub. in Applied Physics Letters v5 n2 p33-5 Jul 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Magnetic fields, Wave transmission), (*Wave transmission, Magnetic fields), Yttrium, Iron, Garnet, Propagation, Attenuation, Scattering.

AD-617 453 Div. 25/4

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.
NEW LINES IN A PULSED XENON LASER,
by John A. Dahlquist. 2 Apr 65, 2p

Unclassified report

Pub. in Applied Physics Letters v6 n10 p193-4 May 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Lasers, Xenon), (*Line spectrum, Xenon), Light pulses.

AD-617 456 Div. 9/4

Rensselaer Polytechnic Inst., Troy, N. Y.
STABILITY OF CURVED FLOWS,
by R. C. Diprima. 8 May 63, 7p

Unclassified report

Pub. in Transactions of the ASME Journal of Applied Mechanics p486-92 Dec 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hydrodynamics, Incompressible flow), (*Incompressible flow, Stability), (*Fluid mechanics, Incompressible flow), Fluid flow, Rotation, Cylindrical bodies, Couette flow, Viscosity, Mathematical analysis.

The general formulation of the hydrodynamic-stability problem is discussed. The problem of the stability of flow between rotating cylinders is considered in some detail. Several related problems which have been investigated in a complete or preliminary manner are mentioned. Finally, the recent work on the nonlinear aspects of the hydrodynamic-stability problem, with particular reference to the stability of flow between rotating cylinders, is discussed. (Author)

AD-617 457 Div. 25/7

Massachusetts Inst. of Tech., Cambridge.
INTENSITY DISTRIBUTION OF THE HOPFIELD CONTINUUM,
by Allan Laslett Smith and John W. Meriwether, Jr.
12 Nov 64, 3p

Unclassified report

Pub. in Journal of Chemical Physics v42 n8 p2984-5 Apr 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Ultraviolet spectroscopy, Electron transitions), (*Helium, Spectra(Visible and ultraviolet)), (*Continuous spectrum, Helium), Diatomic molecules, Atomic energy levels, Excitation, Intensity, Distribution, Reflection.

The reflection method is used to calculate the spectral intensity distribution during the transition of diatomic helium from a bound excited state to its unstable ground state.

AD-617 459 Div. 20/2

California Inst. of Tech., Pasadena.
PHASE-SHIFT ANALYSIS FOR He3(P,P)He3,
by T. A. Tombrello. 4 Nov 64, 8p
Contract Nonr22047

Unclassified report

Pub. in Physical Review v138 n1B pB40-47 Apr 12 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Proton scattering, Helium), (*Phase shift, Proton scattering), Nuclear resonance, Differential cross section, Excitation, Nuclear spins, Nuclear energy levels, Polarization.

A phase-shift analysis based on the scattering and polarization data for the reaction He3(p,p)He3 was made for proton energies between 1.0 and 11.5 MeV. The singlet and triplet S-wave phase shifts are found to be negative and approximately equal; they are in good agreement with the resonating-group calculations of Bransden and Robertson. The P-wave phase shifts are positive and increase with energy; a single-level parametrization of these phase shifts indicates the possible presence of triplet states with J(pi)=2(-), 1-, 0- at center-of-mass energies 4.74, 6.15, and 7.94 MeV above the p+He3 threshold. All three levels have reduced widths that are comparable with the Wigner limit. The presence of a broad singlet 1- level at 9.8 MeV is indicated with somewhat less confidence. (Author)

AD-617 461 Div. 25/7, 25/4

Cornell Univ., Ithaca, N. Y. Lab. of Atomic and Solid State Physics.

PHOTOIONIZATION CROSS SECTION OF NEON IN THE 80 TO 600 A REGION,
by D. L. Ederer and D. H. Tomboulian. 28 Oct 63, 8p
Unclassified report

Pub. in Physical Review v133 n6A pA1525-32 Mar 16 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Neon, Ionization), (*Gas ionization, Probability), Photochemistry, Radiation chemistry, X rays, Photons, Geiger counters, Harmonic oscillators, Absorption spectrum.

The paper presents measurements of the absolute photoionization cross section of neon in the soft x-ray region (80-600A) to an accuracy of 5% or better. Increased reliability of measurements was brought about by various technical improvements such as the use of an absorber cell with suitable windows and the use of a Geiger-Mueller tube specially designed for counting photons whose energy was in excess of 40 eV. At the L2,3 threshold (575 A) the cross section sigma, has a value of 6.3 Mb, rises to a peak value of 10.0 Mb at 375A, and then decreases to 7.8 Mb at the L1 edge (about 261 A). The range of measurements has been extended to 10 Ry above the ionization threshold. Consequently, it was possible to join the results with previous observations made at high energies. With the exception of He, neon is the only other gas for which the value of sigma is known over a large energy range with sufficient precision. This information, combined with estimates of discrete oscillator strengths, led to the first successful evaluation of the Thomas-Reiche-Kuhn sum rule. (Author)

AD-617 462 Div. 25/6, 25/2, 20/1

Cornell Univ., Ithaca, N. Y. Lab of Atomic and Solid State Physics.
NUCLEAR MAGNETIC RESONANCE STUDIES OF THE METALLIC TRANSITION IN DOPED SILICON,
by R. K. Sundfors and D. F. Holcomb. 12 Jun 64, 11p
Unclassified report

Pub. in Physical Review v136 n3A pA810-20 Nov 2 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nuclear magnetic resonance, Silicon), (*Silicon, Impurities), Crystal lattice defects, Nuclear spins, Relaxation time, Phosphorus, Boron, Semiconductors, Solid state physics.

AD-617 463 Div. 25/7

Harvard Univ., Cambridge, Mass.
ROTATIONAL MAGNETIC MOMENTS OF THE ALKALI MOLECULES,
by R. A. Brooks, C. H. Anderson, and N. F. Ramsey.
14 May 64, 7p
Unclassified report

Pub. in Physical Review v136 n1A pA62-68 Oct 5 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Magnetic moments, Alkali metals), (*Molecular rotation, Magnetic moments), Diatomic molecules, Magnetic resonance, Molecular beams.

The rotational magnetic moments of the diatomic alkalis have been measured by the molecular-beam magnetic-resonance method. The values obtained for the gyromagnetic ratios (in nm) are: Li2, 0.10797; Na2, 0.03892; K2, 0.02162; Rb2, 0.00953; Cs2, 0.00547. The effect of the electric quadrupole interaction on the resonance is investigated, and found to lead to a slight broadening, but, in the limit of high J, to no displacement. An interpretation of the results in terms of the irrotational-flow model used by Espe for hydrogen is given. (Author)

AD-617 464 Div. 25/6

Massachusetts Inst. of Tech., Cambridge.
ON THE DERIVATION OF THE THEORY OF THIN ELASTIC SHELLS.
Revised ed.,
by Eric Reissner. 10 Sep 63, 16p
Unclassified report

Pub. in Journal of Mathematics and Physics v42 n4 p263-77 Dec 1963 (Copies not available to DDC or Clearinghouse customers).
Revision of manuscript submitted 6 Feb 63.

Descriptors: (*Elastic shells, Theory), Partial differential equations, Elasticity.

AD-617 465 Div. 25/6

Massachusetts Inst. of Tech., Cambridge.
A PROBLEM OF SHEARING AND TRANSVERSE BENDING OF SHALLOW, HYPERBOLIC, PARABOLOIDAL SHELLS.
Revised ed.,
by D. P. O'Mathuna and E. Reissner. 3 Dec 62, 2p
Unclassified report

Pub. in Journal of Applied Mechanics p295-6 Jun 1963 (Copies not available to DDC or Clearinghouse customers)
Revision of manuscript submitted 3 Aug 62.

Descriptors: (*Shear stresses, Structural shells), (*Deflection, Structural shells), Parabolic bodies, Boundary value problems.

AD-617 469 Div. 25/8

Northwestern Univ., Evanston, Ill. Technological Inst.
TIME-REVERSED MOTION IN KINETIC THEORY,
by M. B. Lewis. 22 Jan 64, 7p
Unclassified report

Pub. in Physical Review v134 n6A pA1410-6 Jun 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Kinetic theory, Motion), Time, Statistical functions, Partial differential equations, Statistical mechanics.

A set of reversible equations for F, the first distribution function and g, the correlation function, are derived for the weak force case. The 'forward motion,' i.e., development in time from uncorrelated initial conditions, and the corresponding reverse motion are examined. In the 'forward motion' the equation for F evolves into the Fokker-Planck equation while in the corresponding reverse motion F is described by an anti-Fokker-Planck equation. (Author)

AD-617 470 Div. 25/4

Harvard Univ., Cambridge, Mass.
3He NUCLEAR ZEEMAN MASER,

by H. G. Robinson and Than Myint. 3 Aug 64, 3p
Unclassified report

Pub. in Applied Physics Letters v5 n6 p116-7 Sep 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Masers, Helium), Nuclear energy levels, Nuclear resonance, Field theory.

AD-617 472 Div. 25/7

National Bureau of Standards, Washington, D. C.
EXPERIMENTAL TRANSITION PROBABILITIES FOR SIX OXYGEN MULTIPLETS,
by J. E. Solarski and W. L. Wiese. 8 Apr 64, 6p
Unclassified report

Pub. in Physical Review v135 n5A pA1236-41 Aug 31 1964 (Copies not available to DDC Customers).

Descriptors: (*Electron transitions, Probability), (*Oxygen, Electron transitions), Plasma medium, Electric arcs, Line spectrum, Spectra(Infrared), Spectra(Visible + ultraviolet).

The transition probabilities of six oxygen-I multiplets in the visible and near infrared region were measured in a wall-stabilized high-current arc operating either in pure oxygen or in a nitrogen-oxygen mixture. Temperatures were obtained from intensity measurements of an oxygen or nitrogen line of known transition probability and by applying the arc equilibrium and conservation equations. Several independent runs were carried out. The results agree usually within 20% with those of other experimental and theoretical methods. (Author)

AD-617 485 Div. 20/2

Carnegie Inst. of Tech., Pittsburgh, Pa.
ROLE OF PARTICLE-HOLE CORRELATIONS IN THE INELASTIC SCATTERING OF ELECTRONS FROM C12, O16, AND Ca40,
by Vincent Gillet and Michel A. Melkanoff.
18 Oct 63, 10p
Unclassified report

Pub. in Physical Review v133 n5B pB1190-9 Mar 9 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Inelastic scattering, Electrons), (*Nuclear models, Excitation), Carbon, Oxygen, Calcium, Nuclear scattering, Differential cross section, Nuclear shell models.

All available experimental data on the inelastic scattering of high-energy electrons from C12, O16, and Ca40 have been analyzed in terms of the particle-hole models of nuclear excitations. The calculations do not involve any free parameters. The results proved quite sensitive to the treatment of nuclear correlations and generally favored the random-phase approximation, which yielded satisfactory agreement with most of the data. (Author)

AD-617 486 Div. 25/4

Rochester Univ., N. Y. Dept. of Physics and Astronomy.
PHENOMENOLOGICAL THEORY OF LASER BEAM FLUCTUATIONS AND BEAM MIXING,
by L. Mandel. 16 Dec 64, 11p
AROD 4965:7 Unclassified report

Pub. in Physical Review v138 n3B pB753-62 May 10 1965 (Copies not available to DDC or Clearinghouse customers).
Supported by ARO(D) and AFCRL.

Descriptors: (*Lasers, Optical phenomena), (*Light, Interference), (*Quantum mechanics, Lasers), Photons, Optical analysis, Fourier analysis, Field theory.

The paper contains a quantum theoretical analysis of laser beam fluctuations and of the light beat experiments with two lasers. With the help of experimental results on photon counting fluctuations in a single-mode laser field, some correlation properties of the field are derived. It is shown that the correlation equations are satisfied by states of the field which are much more general than 'coherent' states. The equations lead directly to the spectral density of the intensity operator in the light beat experiments, which can be obtained from photoelectric measurements. The resulting expression is practically identical to that found by Forrester for light having thermal statistical properties. The reasons for this are discussed by a comparison of the corresponding probability distributions of photon counts and of the classical wave amplitude. (Author)

AD-617 488 Div. 20/1, 20/3

Washington Univ., St. Louis, Mo. Dept. of Physics.
FORMATION OF H3+ AND H5+ IONS,
by M. Saporoschenko. 6 Jul 64, 5p
Contract AT11 1 1291; Grant DA ARO D31 124G532
AROD 2802:13
Unclassified report

Pub. in Journal of Chemical Physics v42 n8 p2760-4 Apr 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hydrogen, Isotopes), (*Ions, Hydrogen), Deuterium, Tritium, Mass spectroscopy, Isotope separation, Low-pressure research, Ionic current, Dissociation.

H+, H2+, H3+, and H5+ ions have been identified in hydrogen gas by use of a mass spectrometer with the ion source in the pressure range from 0.001 to 0.5 mm Hg. Secondary ions are formed in steps of consecutive reactions between ions and hydrogen molecules. Reaction cross sections of the secondary H3+ ions have been determined from the concentration dependence of the intensities of the H2+ ions. The tertiary H5+ ion is formed in three-body collisions of the H3+ ion with the hydrogen molecules. Dissociation processes of all three molecular ions have been observed. (Author)

AD-617 493 Div. 25/8, 25/4

Columbia Radiation Lab., New York.
OBSERVATION OF TIME-DEPENDENT CONCENTRATION FLUCTUATIONS IN A BINARY MIXTURE NEAR THE CRITICAL TEMPERATURE USING A HE-NE LASER,
by S. S. Alpert, Y. Yeh, and E. Lipworth.
23 Feb 65, 3p
Grant DA AROD31 124G380, NSF GP438
AROD 3922:14
Unclassified report

Pub. in Physical Review Letters v14 n13 p486-8 Mar 29 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thermodynamics, Mixtures), (*Mixtures, Density), Phase studies, Liquids, Lasers, Light, Scattering, Spectrum analyzers.

AD-617 497 Div. 25/3, 15/1

National Research Council of Canada, Ottawa (Ontario). Div. of Radio and Electrical Engineering.
A NOTE ON THE FIELD OF A DIPOLE IN A UNIAXIAL MEDIUM,
by R. A. Hurd. 9 Dec 64, 7p Rept. no. NRC-8356
Unclassified report

Pub. in Canadian Journal of Physics v43 p684-8 1965
(Copies available only to DDC users).

Descriptors: (*Electric fields, Tensor analysis), Dipole moments, Field theory.

The results of Clemmow on the field of an electric dipole in a medium with electric anisotropy are extended to include magnetic dipoles in a medium with both electric and magnetic anisotropy. Some misprints in Clemmow's paper are corrected. (Author)

AD-617 500 Div. 25/6

Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
ENGINEERING PROGRESS AT THE UNIVERSITY OF FLORIDA,
by Richard E. Herbert, William A. Nash, James R. Modeer, and F. H. Ho. Apr 65, 18p
AROD 3368:1; AROD 3368:2
Unclassified report

Vol. 19, no. 4
Technical Paper Series; No. 304: Random Vibrations of a Nonlinear Elastic Beam, by Richard E. Herbert, Pub. in The Journal of the Acoustical Society of America v36 n11 p2090-4 Nov 1964; No. 305: Buckling of a Thin Spherical Shell Resting on an Elastic Foundation, by William A. Nash and James R. Modeer, Pub. in Proceedings of the World Conference on Shell Structures p677-80 1964; No. 306: Dynamic Buckling of Spherical Shells, by F. H. Ho and W. A. Nash, Pub. in Non-Classical Shell Problems p330-6 1964.

Descriptors: (*Beams(Structural), Vibration), (*Buckling-(Mechanics), Elastic shells), (*Elastic shells, Buckling-(Mechanics)), Structural shells, Dynamics, Engineering, Florida.

AD-617 502 Div. 25/1, 25/6

Cornell Univ., Ithaca, N. Y.
DISPERSION RELATION FOR SECOND SOUND IN SOLIDS,
by R. A. Guyer and J. A. Krumhansl. 25 Oct 63, 7p
Unclassified report

Pub. in The Physical Review v133 n5A pA1411-7 Mar 2 1964.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sound transmission, Solids), (*Phonons, Scattering), Relaxation time, Partial differential equations, Attenuation.

The dispersion relation for second sound in solids is derived. The starting point of the analysis is a Boltzmann equation for a phonon gas undergoing a temperature perturbation; the Callaway approximation to the collision term is employed. We obtain a dispersion relation which explicitly exhibits the need for a 'window' in the relaxation time spectrum. Further, the dispersion relation shows that measurement of the attenuation of second sound as a function of frequency is a direct measurement of the normal process and umklapp process relaxation times. Macroscopic equations are derived for energy density and energy flux and their relation shown to the macroscopic equations with which Chester has treated second sound. (Author)

AD-617 505 Div. 25/2

Naval Ordnance Test Station, China Lake, Calif.
ZINC SINGLE CRYSTALS WITH HEXAGONAL GEOMETRY GROWN IN MACROSONIC FIELDS.
Technical publication,
by B. Langenecker. 19 Aug 63, 6p
Rept. no. NOTS-TP-3649
NAVWEPS 8620
Unclassified report

Pub. in Acta Crystallographica v17 pt7 p904-7 Jul 1964.
(Copies available only to DDC users).
Revision of manuscript submitted 1 Jul 63.

Descriptors: (*Crystal growth, Single crystals), (*Zinc, Crystal growth), (*Ultrasonic radiation, Crystal growth), Symmetry(Crystallography), Crystal lattice defects, Metallic crystals, Stability.

Application of macrosound (25 kc; W/cm sq.) affects the growth of a cylindrical zinc single crystal whose c axis is almost perpendicular to its length axis so that its shape is changed into a uniform hexagonal geometry. This result is discussed on the basis of concepts that involve the influence of macrosound on the stability of forms of crystal faces through dislocation activation. (Author)

AD-617 506 Div. 25/6, 25/2

Army Materials Research Agency, Watertown, Mass.
AN X-RAY REARCH FOR IONICITY IN GaAs,
by John J. DeMarco and R. J. Weiss. 7 Nov 64, 6p Rept. no. AMRA-TR-65-07
Proj. DA1C014501B11A, Task 35945
Unclassified report

Pub. in Physics Letters v13 n3 p209-10 Dec 1 1964.
(Copies available only to DDC users).

Descriptors: (*Semiconductors, Ionization), (*Gallium alloys, Arsenic alloys), (*Arsenic alloys, X-ray diffraction analysis), Crystals, Electrons, Scattering.

The absolute X-ray scattering factor of the 200 reflection in GaAs was measured and yielded a value larger than for the free atoms. This indicates that GaAs is not very ionic. (Author)

AD-617 510 Div. 25/1, 9/1

John Carroll Univ., Cleveland, Ohio.
PROPAGATION OF ACOUSTIC TRANSIENTS IN ABSORBING AND RELAXING LIQUIDS,
by E. F. Carome, P. A. Fleury, and W. J. Wagner. 17 Aug 64, 7p
Unclassified report

Pub. in Journal of the Acoustical Society of America v36 n12 p2368-73 Dec 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Acoustics, Liquids), (*Fluid mechanics, Acoustics), Mechanical waves, Propagation, Carbon tetrachloride, Propionic acid, Energy, Absorption, Relaxation time.

A study was made of the propagation of pressure impulses approximately 0.1 micron sec wide in liquids exhibiting viscous absorption, i.e., constant alpha/sq omega and relaxation effects. Computed variations of impulse shape as a function of path length are obtained by solving numerically the appropriate linearized wave equations. These are compared with experimental data obtained in such liquids as carbon tetrachloride, carbon disulfide, and acetic and propionic acids. Significant differences are noted in the variation of shape and the veocity of propagation of the impulse maximum in the two types of media. (Author)

AD-617 511 Div. 20/2, 25/5, 2/6

Lyman Lab. of Physics, Harvard Univ., Cambridge, Mass.
EFFECT OF GRAVITY ON NUCLEAR RESONANCE,
by R. V. Pound and J. L. Snider. 24 Sep 64, 2p
Unclassified report

Pub. in Physical Review Letters v13 n18 p539-40 Nov 2 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Nuclear resonance, Gravity), (*Gravity, Nuclear resonance), Mossbauer effect, Relativity theory.

AD-617 513 Div. 25/7

Lyman Lab. of Physics, Harvard Univ., Cambridge, Mass.
NUCLEAR INTERACTIONS AND ROTATIONAL MOMENT OF F2,
by Irving Ozier, Lawrence M. Crapo, James W. Cederberg, and Norman F. Ramsey.
9 Sep 64, 3p
Unclassified report

Pub. in Physical Review Letters v13 n15 p482-4 Oct 12 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Fluorine, Molecular structure), (*Molecular rotation, Fluorine), (*Nuclear magnetic moments, Fluorine), Nuclear spins, Perturbation theory.

AD-617 521 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Delaware Univ., Newark. Dept. of Physics.
VOLUME PHOTOELECTRIC EFFECT IN METALS, CHARACTERISTIC ENERGY LOSSES IN LAYERED METALLIC THIN FILMS, A MODIFIED FARADAY CAGE.
Final rept. for 1 Feb 64-31 Jan 65,
by N. N. Axelrod and W. R. Miller. 31 Jan 65, 47p
Contract NONR228505, Proj. NR017 461
Unclassified report

Descriptors: (*Photoelectric effect, Metal films), (*Metal films, Energy), Metals, Aluminum, Bismuth, Indium, Surface properties, Plasma medium.

Photoelectric measurements indicate that previously measured volume photoelectric thresholds in metals between 8 and 9 1/2 e.v. are the result of gaseous contamination of the metals. The out-of-focus grazing vacuum monochromator design allows simple and inexpensive contruction of monochromators for the soft x-ray region such that the exit and entrance slits are fixed during a spectral scan and are not inside the main vacuum chamber. This permits use of the pseudo-window for the production of better vacua in which to prepare samples for study. The first direct measurement of the surface plasma loss at the interface between two metals gives further support to the surface plasma wave theory in metals. The sum of the volume plasma losses for layered thin films has also been observed. A modification of the Faraday cage is described which improved the performance of this detector.

AD-617 522 Div. 25/5
CFSTI Prices: HC$1.00 MF$0.50

Colorado Univ., Boulder.
QUANTUM MECHANICS OF THE (p-Mu-p)+ MOLECULAR ION,
by Paul Phillipson and W. Roy Wessel. 1963, 7p
Rept. no. U-COL-64-16
Unclassified report

Prepared in cooperation with Michigan Univ., Ann Arbor. Dept. of Physics.

Descriptors: (*Protons, Muons), (*Muons, Protons), (*Quantum mechanics, Ions), Hamiltonian, Meson capture.

Wave functions and energies are computed using the exact Hamiltonian of (p-muon-p)+.

AD-617 527 Div. 25/5, 25/4
CFSTI Prices: HC$3.00 MF$0.75

TRW Space Technology Labs., Redondo Beach, Calif.
QUANTUM THEORY OF INTENSE PHOTON BEAMS.
Final rept.,
by Lee M. Frantz. 9 Jun 65, 63p
Rept. no. 4165-6003-RU-000
Contract DA31 124AROD213, Proj. 20010501B700
Unclassified report

Descriptors: (*Quantum mechanics, Photons), (*Photons, Quantum mechanics), Intensity, Lasers, Field theory, Perturbation theory, Vector analysis.

A formal expression was derived for the field theoretic transition amplitude in a Brillouin-Wigner perturbation expansion. The principal innovation is the use of wave packets to introduce the boundary conditions, thereby avoiding the need for invoking the adiabatic hypothesis. The field of incident particles, but not the scatter, is second quantized. No restrictions are placed on the number of incident quanta. The resulting expression is thus appropriate, for example, to the nonrelativistic description of the scattering of a photon beam of arbitrary intensity by an atom. A set of formally exact scattering eigenvectors is produced. A time-dependent solution to the Schroedinger equation is then formed from a weighted superposition of them. An asymptotic expansion of the wave function in reciprocal powers of the time was developed and shown to have the form, in the remote past and future, of a free wave packet of quanta spatially isolated from the scatterer. The transition amplitude was identified by a comparison of the initial and final-state wave packets, and found to be a super-position of elements of the usual Brillouin-Wigner T-matrix, each weighted by the corresponding weight factor in the initial-state wave packet. (Author)

AD-617 529 Div. 20/2, 25/5
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.

A SEARCH FOR QUARKS.
Technical rept.,
by M. di Corato, W. B. Fretter, H. J. Lubatti, and W. Michael. 7 Apr 64, 5p
Rept. no. UCB-64-2
Unclassified report

Supported by Office of Naval Research.

Descriptors: (*Charged particles, Elementary particles), (*Elementary particles, Charged particles), Proton bombardment, Nuclei, Nuclear particles, Nuclear structure, Baryons, Quantum mechanics.

An unsuccessful search for quarks produced by proton interactions with nuclei is reported.

AD-617 534 Div. 25/6, 31/5
CFSTI Prices: HC$1.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
SPHERICAL SHELL WEAKENED BY TWO UNEQUAL CIRCULAR HOLES,
by G. N. Savin, G. A. Van Fo Fy, and V. N. Buivol. Mar 65, 14p Trans-320
TT 65-62565
Unclassified report

Trans. of mono. Vsesoyuznaya Konferentsiyz po Teorii Plastin i Obolochek (no.2) Lvov, 1961. Trudy, 1962 p89.

Descriptors: (*Structural shells, Stresses), (*Spheres, Stresses), Hatches, Differential equations, Force-(Mechanics), Mathematical analysis, Loading(Mechanics), USSR.

The method of successive approximations is used to obtain a solution of the problem of the distribution of stresses around two unequal circular holes in a spherical shell loaded by a constant internal pressure and constant shear forces along the contours of the holes. Finding the successive approximations is reduced to a solution of an equation under appropriate boundary conditions. Two approximations are found, a numerical example is discussed, and the boundaries of the applicability of the solution are indicated. (Author)

AD-617 540 Div. 9/4, 22/4
CFSTI Prices: HC$4.00 MF$1.00

General Atomic Div., General Dynamics Corp., San Diego, Calif.
THE THEORY OF HYPERVELOCITY IMPACT.
Annual status rept.,
by J. K. Dienes, W. E. Johnson, W. B. Lindley, and J. M. Walsh. 28 Jun 65, 124p Rept. no. GA-6509
Contract DA04 495AMC116X, ARPA Order 71 62
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
See also AD-608 870.

Descriptors: (*Impact shock, Hypervelocity projectiles), (*Hypervelocity projectiles, Impact shock), (*Hydrodynamics, Impact shock), Numerical analysis, Oils, Viscosity, Equations of state, Motion, Terminal ballistics, Programming(Computers), Fluid mechanics.

The three principal areas of activity, (1) Numerical solutions of problems in impact, (2) Code development for solving impact problems, and (3) Analytical work on the theory of the impact process, are reviewed, utilizing wherever possible cited papers which have been published during this past year as part of the project work. The investigations covered in these papers are described only briefly in the present status report, familiarity with or availability of the original documents being assumed. The major part of the present discussion is devoted to a status report of unfinished work on the problem of computing strength-dependent and viscous impact flows. A computer program is described for generalizing Eulerian hydrodynamic codes to include these effects and sample calculations are given. (Author)

AD-617 542 Div. 25/3, 25/6
CFSTI Prices: HC$4.00 MF$1.00

Delaware Univ., Newark. Dept. of Physics.
CHARACTERISTIC ENERGY LOSSES IN LAYERED METALLIC THIN FILMS.
Technical rept. for 1 Feb 64-31 Jan 65,
by N. N. Axelrod. 31 Jan 65, 121p
Contract Nonr228505, Proj. NR017 461
Unclassified report

Descriptors: (*Metal films, Electrical properties), (*Solid state physics, Metal films), Surface properties, Energy, Attenuation, Electrons, Motion, Bismuth, Magnesium, Aluminum, Theory, Quantum mechanics, Plasma physics, Excitation.

The characteristic electron energy loss spectra of layered films of Bi and Mg have been measured using a retarding potential electron energy analyzer with an electrically differentiated output to obtain the energy loss distribution directly. A new loss, that was not observed on single layer films of Mg or Bi, was found at 12.9 ± 0.2 e.v. This loss can be interpreted as a surface plasma loss at the metal-metal interface. A surface loss in Al-Mg films was not reproducible, but a new loss was observed at 26.4 e.v. which can be interpreted as a single Al loss (15.4 ev) plus a single Mg loss (10.9 ev). Chemical and physical processes such as changes in composition and aggregation at the Al-Mg interface during both the preparation and measurement of the sample may alter the interface enough to decrease the intensity of the surface plasma loss. (Author)

AD-617 550 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

Redstone Scientific Information Center, Redstone Arsenal, Ala.
ELECTROMOTIVE FORCE INDUCED IN FERROMAGNETIC WIRE BY OSCILLATORY MAGNETIC FIELD PARALLEL TO THE WIRE,
by R. Skorski. Apr 65, 34p
Rept. no. RSIC-400
TT 65-62566
Unclassified report

Trans. of Instytut Mechaniki Precyzyjnej. Prace (Poland) v8 n29 p1-21 1960.

Descriptors: (*Ferromagnetic materials, Wire), (*Wire, Electric currents), (*Electromagnetism, Ferromagnetic materials), Magnetic fields, Oscillation, Intensity, Deformation, Physical properties, Chemical properties, Cold working, Drawing(Machine processing), Temperature, Electromagnetic pulses, Poland.

The article presents a schematic drawing and a principle of inducing an EMF in ferromagnetic wires by means of an oscillatory magnetic field parallel to the wire. Also presented is a table of chemical composition of the wires, the wire torsional twiset effect on EMF, the

wire magnetic field strength effects of length, diameter, and chemical composition on the character of EMF impulses, and of combining of EMF's of two wires having different ferromagnetic properties. Effects of a hard-drawn wire on the flow of impulses and of temperature, are also presented. Final results are given. (Author)

AD-617 553 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

Innsbruck Univ. (Austria).
INTERACTION BETWEEN MAGNETIC FIELD AND FLOW FIELD FOR PLASMAS OF INFINITE CONDUCTIVITY.
Scientific rept.,
by Ferdinand Cap and Gerold Kerer. 15 Oct 64, 8p
Rept. no. SR-17
Contract AF61 052 675
AFOSR 65-0933
Unclassified report

Descriptors: (*Plasma medium, Two-dimensional flow), (*Two-dimension flow, Magnetic fields), (*Magnetic fields, Two-dimensional flow), Plasma physics, Electrical conductance, Partial differential equations.

Assuming that the boundary curve of a two-dimensional steady flow is given analytically and that the magnetic field in the whole flow domain is vertical to the flow velocity it is possible to calculate the magnetic field at the boundary.

AD-617 562 Div. 25/3
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., Philadelphia, Pa. Missile and Space Div.
FUNDAMENTALS OF MHD FLOW.
Final rept.,
by Arthur Sherman. Jun 64, 12p
Contract AF49 638 914
AFOSR 64-1425
Unclassified report

Descriptors: (*Magnetohydrodynamics, Fluid flow), (*Crossed field devices, Magnetohydrodynamics), Plasma medium, Electric propulsion, Boundary layer.

Magnetohydrodynamic phenomena associated with crossed field devices are investigated. The working medium was assumed to be a partially ionized plasma at relatively low temperatures (1500 -3000 K), so that Magnetic Reynolds numbers were assumed to be much less than one. As a result, it was typically assumed that the applied magnetic field was not distorted by currents flowing in the plasma, although for some problems this simplification was not necessary. Several studies were made of the properties of the low temperature plasmas of interest. Then a large number of channel flow problems were analyzed and reported upon. Some magnetohydrodynamic boundary layer phenomena were next reviewed, and following this a broad review was made of the propulsion and power generation application areas. New concepts were developed for the macroscopic description of the non-equilibrium ionization idea.

AD-617 570 Div. 25/6
CFSTI Prices: HC$3.00 MF$0.75

California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
THREE-DIMENSIONAL STRESS CONCENTRATION AROUND A CYLINDRICAL HOLE IN A SEMI-INFINITE ELASTIC BODY.
Technical rept.,
by Carl K. Youngdahl and Eli Sternberg. May 65, 54p
Rept. no. TR-2
Contract Nonr22058, Proj. NR064 431
Unclassified report

Descriptors: (*Stresses, Boundary value problems), (*Boundary value problems, Stresses), (*Elasticity, Cylindrical bodies), Numerical analysis, Integral transforms.

This paper contains a three-dimensional solution, exact within classical elastostatics, for the stresses and deformations arising in a halfspace with a semi-infinite transverse cylindrical hole, if the body--at infinite distances from its cylindrical boundary-- is subjected to an arbitrary uniform plane field of stress that is parallel to the bounding plane. The solution presented is in integral form and is deduced with the aid of the Papkovich stress functions by means of an especially adapted, unconventional, integral-transform technique. Numerical results for the non-vanishing stresses along the boundary of the hole and for the normal displacement at the plane boundary, corresponding to several values of Poisson's ratio, are also included. These results exhibit in detail the three-dimensional stress boundary layer that emerges near the edges of the hole in the analogous problem for a plate of finite thickness, as the ratio of the plate-thickness to the diameter of the hole grows beyond bounds. The results obtained thus illustrate the limitations inherent in the two-dimensional plane-strain treatment of the spatial plane problem; in addition, they are relevant to failure considerations and are of interest in connection with experimental stress analysis. (Author)

AD-617 574 Div. 25/2

California Univ., Los Angeles. Dept. of Physics.
ENERGY LEVELS OF U(4+) IN AN OCTAHEDRAL CRYSTALLINE FIELD,
by R. A. Satten, C. L. Schreiber, and Wong.
31 Jul 64, 10p
AROD 2099:23
Unclassified report

Pub. in Journal of Chemical Physics v42 n1 p162-71 Jan 1 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Atomic energy levels, Uranium compounds), (*Uranium compounds, Crystal structure), (*Crystal structure, Field theory), Uranium, Ions, Symmetry(Crystallography), Absorption spectrum, Integrals.

The electronic energy levels determined from absorption spectra of U(4+) in crystals containing UC16(2) complexes are identified as to irreducible representation and the resulting set of levels used to determine the least-squares best values of Slater integrals, spin-orbit, and fourth- and sixth-degree crystalline potential parameters. It was necessary to diagonalize within the 5f2 configuration all these interactions simultaneously. New data on the spectra of the UBr6(2-) complex are presented. (Author)

AD-617 577 Div. 25/1, 25/8, 25/4

John Carroll Univ., Cleveland, Ohio. Dept. of Physics.
GENERATION OF ACOUSTIC SIGNALS IN LIQUIDS BY RUBY LASER-INDUCED THERMAL STRESS TRANSIENTS,
by E F. Carome, N. A. Clark, and C. E. Moeller.
29 Jan 64, 3p
Unclassified report

Pub. in Applied Physics Letters v4 n6 p95-6 Mar 15 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Sound signals, Thermal stresses), (*Thermal stresses, Lasers), Sound generators, Liquids, Stresses, Ruby, Mechanical waves.

AD-617 582 Div. 25/8, 4/4

Royal Military Coll. of Canada, Kingston (Ontario). Dept. of Physics.
THE THICKNESS OF MOVING HELIUM II FILM,
by P. W. F. Gribbon and L. C. Jackson. 4 Feb 63, 10p
Grant DRB9510 23, Proj. D48 95 10 23
Unclassified report

Pub. in Canadian Journal of Physics v41 p1047-55 1963 (Copies available only to DDC users).

Descriptors: (*Helium, Films), (*Films, Thickness), Cryogenics, Liquefied gases, Polarization.

The thickness of moving liquid helium II films was measured using the polarized light method developed by Burge and Jackson. The moving film was that on the outside of a cylindrical stainless steel beaker emptying by creep at the rate corresponding to the temperature for the two cases 1.68 K and 1.83 K. Measured at a height of 1 cm above the outer level of the liquid the thicknesses were 5.6% and 4.5% less than those of the stationary film at 1.68K and 1.83K respectively. The observations are compared with the theoretical expressions for the difference in thickness of stationary and moving films derived by Kontorovich and by Franchetti. (Author)

AD-617 610 Div. 25/3
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles. Dept. of Physics.
THEORY OF A CONFIGURATIONAL EMF,
by Marvin Chester. 1963, 27p
Unclassified report

Manuscript of rept. pub. in Physical Review (U. S.) v133 n4A pA907-15 Feb 17 1964 (AD-613 146, not available to DDC or Clearinghouse customers).

Descriptors: (*Voltage, Transport properties), (*Field theory, Voltage), Integral equations, Electric currents, Electric fields, Configuration, Solid state physics, Magnetic fields.

A configurational emf refers to an electrical manifestation in the electron gas of the analogue of the Bernoulli effect for fluid flow. A theoretical account of this phenomenon is given. The object of the theory is to present a description of the effect from first principles which in this instance is taken as the Boltzmann transport equation. The transport equation is solved for a two band (holes and electrons) Fermi particle system. The solutions are carried beyond first order so as to exhibit the effect. It is shown that the form of the emf is, indeed, extractable from the Boltzmann equation. And its magnitude is obtained in terms of a coefficient C for which a formula is given in terms of familiar current carrier parameters. (Author)

AD-617 619 Div. 25/3
CFSTI Prices: HC$3.00 MF$0.75

Brown Univ., Providence, R. I. Div. of Engineering.
REFLECTION OF ELECTROMAGNETIC WAVES FROM INHOMOGENEOUS PLASMA.
Scientific rept.,
by Chao Han Liu and Lewis Wetzel. Jun 65, 85p
Rept. nos. AF-2498/6, SR-6
Contract AF19 628 2498, Proj. 5635, Task 563503
AFCRL 65-334
Unclassified report

Descriptors: (*Electromagnetic wave reflections, Plasma medium), (*Plasma medium, Electromagnetic wave reflections), Dielectrics, Refractive index, Ionospheric propagation, Electron density, Calculus of variations, Integral equations.

Reflections of electromagnetic waves and signals from an inhomogeneous, lossy, dispersive, anisotropic medium are discussed. Discussion is mainly confined to one dimensional stratified medium and high frequency waves. The medium can be either a dielectric or a plasma region. Reflection of a monochromatic electromagnetic wave from a stratified medium is considered. To determine whether the weak reflections of order 1/K come from the bulk effect of inhomogeneity of the medium or from the discontinuities of the gradients of the refractive index, a straightforward field analysis is used in which the behavior of the refractive index in the neighborhood of a gradient discontinuity is controlled by adjustable parameters. An integral equation is derived from the wave equation and from it, a variational expression is obtained for the correction term to the WKB approximation result for the reflection coefficient. The reflection of a turned-on sine signal from a plasma medium is considered. In the plasma, the electron density varies linearly in one direction. Complex integration is used to calculate the reflected signal.

AD-617 627 Div. 25/6, 17/2

Illinois Univ., Urbana.
EFFECT OF Al, Si, Ge AND Sn SOLUTES ON THE ELECTRONIC STRUCTURE OF BODY-CENTRED CUBIC ALLOYS OF 3d TRANSITION ELEMENTS,
by P. A. Beck. 1964, 4p
Grant DA AROD31 124G609
AROD 5103:2
Unclassified report

Pub. in Metals and Alloys III p178-81.
(Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Solid solutions, Transition elements), (*Transition elements, Alloys), (*Alloys, Atomic energy levels), Vanadium alloys, Chromium alloys, Iron alloys, Titanium alloys, Aluminum alloys, Silicon alloys, Germanium alloys, Tin alloys, Cobalt alloys, Specific heat, Measurement, Electrons, Magnetic moments.

Electronic specific heat measurements were made for binary and ternary body-centred cubic alloys of 3d transition elements with Al. The results indicate that the effect of Al in solution can not be described in terms of filling a 'rigid' or a 'semi-rigid' d band by the valence electrons of the Al atoms. More limited data for alloys with Sn indicate similar behaviour. The electronic specific heat of Fe alloys with Si, Ge and Sb also varies with the alloy composition in a manner very similar to that of Fe-Al alloys. (Author)

AD-617 630 Div. 25/2, 25/6

California Univ., Los Angeles. Dept. of Physics.
THEORY FOR THE CONTRIBUTION OF CONFIGURATIONAL ADMIXTURES TO THE ZERO FIELD SPLITTING OF PARAMAGNETIC IONS IN AN AXIAL

CRYSTALLINE FIELD,
by R. Orbach, T. P. Das, and R. R. Sharma. 1963, 5p

Unclassified report

Pub. in Covalency and Exchange Effects I p330-4. (Copies not available to DDC or Clearinghouse customers). Supported by NSF and ONR.

Descriptors: (*Field theory, Crystals), (*Ions, Paramagnetic materials), (*Crystallography, Field theory), Perturbation theory, Spin, Electrons, Valence, Atomic energy levels.

AD-617 632 Div. 25/2

Cavendish Lab., Univ. of Cambridge (England).
THE DETECTION OF SECONDARY SLIP DURING THE DEFORMATION OF COPPER AND ALPHA-BRASS SINGLE CRYSTALS,
by T. E. Mitchell and P. R. Thornton. 28 Mar 64, 9p
Contract AF61 052 98, Proj. 9763, Task 976301
AFOSR 65-0762

Unclassified report

Pub. in Philosophical Magazine v10 n104 p315-23 Aug 1964.
(Copies available only to DDC users).

Descriptors: (*Copper, Deformation), (*Brass, Deformation), (*Deformation, Single crystals), Crystal lattice defects, X-ray photography.

Deviations from single glide during the deformation of Cu single crystals have been detected by following the orientation of the tensile axis using x-ray techniques. The deviations for room temperature deformation of some crystals can be explained if it is assumed that 5-10% of the elongation is produced by slip on the secondary systems and the remainder on the primary system. The deviations from single glide are much smaller in alpha-brass crystals which also show more overshoot, so that secondary slip is inhibited. It is suggested that secondary slip is produced near the heads of piled-up groups of primary dislocations at the ends of newly formed slip lines where the resolved shear stress on the secondary systems is high. Secondary slip is thus very localized, producing little strain, but it can give rise to a high forest density.

AD-617 635 Div. 25/6

Purdue Univ., Lafayette, Ind.
PHOTOLUMINESCENCE OF INDIUM ARSENIDE,
by A. Mooradian and H. Y. Fan. 1964, 9p
AROD 3655:19

Unclassified report

Pub. in Extrait des Comptes Rendus du Congres International (7th). Recombinaison Radiative dans les Semiconducteurs p39-6 1964 (Copies available only to DDC users).

Descriptors: (*Semiconductors, Luminescence), (*Gallium alloys, Arsenic alloys), (*Arsenic alloys, Luminescence), (*Luminescence, Semiconductors), Photoelectric effect, Cryogenics, Magnetic fields, Continuous spectrum, Impurities, Emissivity.

The photoluminescence of InAs was studied at temperatures: 77K, 4.2K, and 1.5K, in magnetic fields up to 30 kgauss. Samples were directly immersed in the coolant and were excited optically by using a pulsed high pressure mercury lamp. The emission was analysed by using a grating monochrometer and a p-type gold doped germanium photoconductive detector operating at 77K. All samples were polished and etched prior to measurement. (Author)

AD-617 641 Div. 25/2, 25/6

Case Inst. of Tech., Cleveland, Ohio.
PRESSURE DERIVATIVES OF THE ELASTIC CONSTANTS OF POTASSIUM,
by P. A. Smith and Charles S. Smith. 13 Jul 64, 12p

Unclassified report

Pub. in Journal of Physics and Chemistry of Solids v26 p279-89 1965(Copies available only to DDC users). Supported by ONR and Union Carbide Corp.

Descriptors: (*Elasticity, Potassium), (*Potassium, Single crystals), Pressure, Shear stresses, Crystal structure, Anisotropy, Valence, Electrons.

The elastic stiffness constants of single crystal potassium and their pressure derivatives have been measured at room temperature by the ultrasonic pulse echo method. The values found are: C = 1.88, C' = 0.281, B = 3.34 (units of 10 to the 10th power dyn-cm-sq), dC/dP = 1.62, dC'/dP = 0.251, dB/dP = 3.97. The notation C = C44, C' = (C11-C12)/2, B= (C11+2C12)/3 has been used. The results have been interpreted in terms of Fuchs' theory of the electrostatic contribution to the shear stiffnesses of the alkali metals. The experimental observation that the elastic anisotropy, C/C', does not depend on pressure indicates that, as Daniels found for sodium, it is not necessary to include an ion core interaction or a Fermi contribution to the shear stiffnesses in order to account for the results. The latter conclusion is consistent with a spherical Fermi surface. The bulk modulus and its pressure dependence fit very well the simplest model of the binding energy. (Author)

AD-617 642 Div. 25/6, 25/2

Case Inst. of Tech., Cleveland, Ohio.
PRESSURE DERIVATIVES OF THE ELASTIC CONSTANTS OF NaCl AND KCl AT 295K AND 195K,
by R. A. Bartels and D. E. Schuele. 2 Sep 64, 14p

Unclassified report

Pub. in Journal of Physics and Chemistry of Solids v26 p537-49 1965 (Copies available only to DDC users). Supported by ONR and Union Carbide Corp.

Descriptors: (*Sodium compounds, Elasticity), (*Potassium compounds, Elasticity), (*Chlorides, Elasticity), (*Elasticity, Chlorides), Pressure, Ultrasonic radiation, Equations of state, Thermodynamics, Crystal lattices.

The pressure derivatives of the adiabatic elastic constants of NaCl and KCl have been measured at 295K and 195K using the ultrasonic pulse-echo technique. The results were used to calculate mode gammas. These values were found to have no strong temperature dependence. The mode gammas were suitably averaged to obtain values of Gruneisen's parameter which agree satisfactorially with those from the Mie-Gruneisen equation of state.

AD-617 648 Div. 25/6, 25/2

Lockheed Missiles and Space Co., Palo Alto, Calif. Research Labs.

B-O RECENT PROGRESS IN ENERGY BAND THEORY,
by F. Herman. 1964, 20p
Unclassified report

Reprint (Copies available only to DDC users).
Supported by ONR and Lockheed Independent Research Fund.

Descriptors: (*Atomic energy levels, Semiconductors), (*Semiconductors, Atomic energy levels), Atomic orbitals, Pressure, Potential theory, Crystallography, Electrical conductance, Valence, Atomic structure, Relatively theory, Tin, Silicon, Diamonds, Germanium.

Current methods used in the study of energy bands are examined. Mistakes made because of arbitrarily constructed crystal potentials are pointed out, as are the advantages of self-consistent calculations. A method of accounting for electron exchange and correlation, as well as relativistic effects and spin-orbit interactions is considered. Preliminary results are given for self-consistent non-relativistic calculations for diamond, silicon, germanium, and gray tin.

AD-617 649 Div. 25/3

Research Lab. of Electronics, Mass. Inst. of Tech., Cambridge.
ELECTRODYNAMICS OF MOVING MEDIA,
by P. Penfield, Jr. 3 Dec 64, 1p
Contract DA36 039AMC03200E
Unclassified report

Pub. in Institute of Electrical and Electronics Engineers v53 n4 p422 Apr 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electromagnetism, Motion), Dynamics, Electric currents.

AD-617 655 Div. 25/4, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A CREATIVE RAY,
by N. Basov and V. Leshkovtsev. 20 May 65, 9p
Rept. no. FTD-TT-65-121
TT 65-62570
Unclassified report

Unedited rough draft trans. from Izvestiya (USSR) 12 Jul p5 1964.

Descriptors: (*Lasers, Semiconductors), (*Semiconductors, Lasers), Energy conversion, Semiconductor devices, Ruby, USSR.

The development and uses of semiconductor lasers are discussed briefly.

AD-617 667 Div. 25/4, 30/5
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
A METHOD FOR MEASURING THE ENERGY OF SHORT-WAVE SOLAR RADIATION AND ALSO ARTIFICIAL RADIATION AT WAVELENGTHS SHORTER THAN 1350 A,
by A. V. Chudaikin, T. V. Kazachevskaya, S. V. Repolovskii, A. Ya. Lishanov, and V. S. Medvedev.
21 May 65, 6p Rept. no. FTD-TT-65-466
TT 65-62582 Unclassified report

Unedited rough draft trans. of Russian patent 161506, pub 13 Jul 62, appl. 786445/26-10.

Descriptors: (*Solar radiation, Ultraviolet radiation), (*Ultraviolet radiation, Solar radiation), Measurement, Optical equipment, Photoelectric materials, Telemeter systems, Sounding rockets, Scientific satellites, Ceramic materials, Semiconducting films, Phosphorescent materials, USSR.

The principle of operation of this method is as follows. A metallic disc which is periodically rotated by an electric motor, is mounted with several ceramic plates covered with a semiconducting heating layer which in turn is covered with the thermolucent phosphor CaSO4(Mn). The plates with the phosphor are irradiated in turn and then placed before a photomultiplier. A current is passed through the semiconducting layer, the plate begins to heat, and the energy stored by the phosphor is re-emitted. Energy re-emitted in the visible spectral range is detected by the photomultiplier. The measurement results are transmitted by a radio telemetry system to the earth. The de-excited plates are cooled by heat transfer to the instrument housing.

AD-617 673 Div. 25/6, 8/6, 20/3
CFSTI Prices: H$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
CERTAIN CHARACTERISTICS CONCERNING THE EFFECT OF X-AND GAMMA-RAYS ON THE ELECTRICAL RESISTANCE OF CdS CRYSTALS,
by M. A. Talibi and A. G. Yusifov. 2 Jul 65,
11p Rept. no. FTD-TT-64-1162
TT 65-62587
Unclassified report

Unedited rough draft trans. of Akademiya Nauk Azerbaidzhanskoi SSR, Baku. Izvestiya. Seriya Fiziko-Matematicheskikh i Tekhnicheskikh Nauk, n6 p91-7 1960.

Descriptors: (*Electromagnetic waves, Radiation damage), (*Radiation damage, Semiconductors), (*Cadmium compounds, Sulfides), (*Semiconductors, Single crystals), X-rays, Gamma rays, Resistance-(Electrical), Dosimeters, Calibration.

The effect of x-rays of various wave composition and intensity was investigated, as well as the effect of gamma rays on the electrical resistance of CdS monocrystals. The criterion, determining sensitivity, was a change in dark resistance in dependence upon the intensity and wave composition of the effective short wave radiation. The resistance was measured with a multirange line megometer. When a CdS crystal is used in the role of sensing element of gamma and x-ray dosimeter individual calibration is needed for each concrete case and for each sensing element. CdS sensitivity of the sensing element differs even for identical radiation dosages of various wave compositions.

AD-617 677 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DESIGNING A 4-CONTACT METHOD FOR MEASURING THE SPECIFIC ELECTRIC CONDUCTIVITY OF THIN SEMICONDUCTOR FILMS,
by Yu. P. Kozhevnikov. 1 Jul 65, 7p
Rept. no. FTD-TT-65-668
TT 65-62591
Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n2 p173-5 1964

Available copy will not permit fully legible reproduction.

Descriptors: (*Semiconducting films, Electrical conductance), (*Electrical conductance, Measurement), Design, USSR.

AD-617 682 Div. 25/8, 25/6, 30/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
PHYSICISTS PEEK INTO THE FUTURE,
by N. N. Sirota. 24 May 65, 8p
Rept. no. FTD-TT-64-1250
TT 65-62596
Unclassified report

Unedited rough draft trans. from Sovetskaya Belorussiya (USSR) 1 Jul p3 1964.

Descriptors: (*Cryogenics, USSR), Scientific research, Laboratories, Superconductors, Low-temperature.

AD-617 684 Div. 25/6
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
METHOD OF CREATING p-n TRANSFERS,
by I. I. Patalakh, I. M. Kustanovich, and L. S. Polak.
2 Jul 65, 5p Rept. no. FTD-TT-65-237
TT 65-62598
Unclassified report

Unedited rough draft trans. of Patent (USSR) 161 074, appl. no. 798839/26-9, 15 Oct 62.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Semiconductors, Electrical conductance), Impurities, Polymers, USSR.

A method is proposed for creating p--n transfers on organic and inorganic polymer semiconductor materials based on the use of different signs of the carrying current in the surface layer and volume of these polymers.

AD-617 686 Div. 8/6, 5/2
CFSTI Prices: HC$5.00 MF$1.25

Rome Air Development Center, Griffiss AFB, N. Y.
SOME ASPECTS OF FM DESIGN FOR LINE-OF-SIGHT MICROWAVE AND TROPOSCATTER SYSTEMS.
Final rept.,
by R. L. Marks, F. Zawislan, J. McClure, and R. Fellows, Jr. Apr 65, 197p RADC-TR-65-51
Unclassified report

Descriptors: (*Microwave relay systems, Frequency modulation), (*Troposphere, Radio transmission), (*Radio transmission, Troposphere), (*Communication theory, Microwave communication systems), Radio equipment, Radio waves, Propagation, Multiplex, Gain, Reflectors, Modulation, Integrators, Systems engineering.

The purpose of this report is to discuss those elements of system design that influence the performance of troposcatter and microwave line-of-sight systems. The material is presented in a continuous manner in order to effect an appreciation and understanding of the significance of the various design variables and to reveal the relationship of the variables with respect to the overall system design objectives. The effects of the transmission media are also discussed and presented simply as one additional element in the overall design problem. This report also consolidates the various applicable equations, curves, discussions and nomographs that are now in other selected reports and studies. The National Bureau of Standards' method of predicting circuit performance is discussed. A number of representative problems are analyzed. The report discusses further various FM receiver and transmitter parameters, system noise objectives, standards and propagation equations for troposcatter and microwave line-of-sight (LOS) operation. The material covered, with a few exceptions, has been covered in other literature, but usually on an individual parameter basis, and does not show the necessary relationship to the overall system design objective. The design and performance characteristics of a network must be viewed from a system point of view in order to achieve the optimum in overall performance and to show the effect on the overall system of individual parameters. (Author)

AD-617 687 Div. 25/8
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
BOUNDS IN MELTING SLABS WITH SEVERAL TRANSFORMATION TEMPERATURES.
Technical rept.,
by Ting-Shu Wu. Feb 64, 29p Rept. no. TR-28
Contract Nonr425907, Proj. NR064 401
Unclassified report

Descriptors: (*Phase studies, Mathematical analysis), (*Melting, Temperature), Transformations, Metals, Theorems, Boundary value problems, Partial differential equations.

The problem studied concerns the establishment of a uniqueness theorem and a comparison theorem, which are essential in the construction of bounds, for a multiphase slab which is insulated on one face and is heated in an arbitrary manner on the other. The material is assumed to possess an arbitrary but finite number of transformation temperatures. Each phase of the material may have distinct thermal properties, and each change of phase is assumed to take place at a given temperature and may be accompanied by the absorption of heat. (Author)

AD-617 696 Div. 25/3
CFSTI Prices: HC$5.00 MF$1.00

Illinois Univ., Urbana. Gaseous Electronics, Lab.
TIE HELICAL INSTABILITY PRODUCED IN GASEOUS MAGNETOPLASMAS BY THE GYRO-INTERACTION OF MICROWAVES.
Scientific rept.,
by B. E. Cherrington and L. Goldstein. Jun 65,
175p Rept. no. SR-1
Contract AF19 628 2391, Proj. 8605, Task 860502
AFCRL 65-257
Unclassified report

Descriptors: (*Plasma medium, Stability), (*Microwave frequency, Resonance absorption), (*Resonance absorption, Plasma medium), Differential equations, Magnetohydrodynamics, Perturbation theory, Plasma oscillations, Helixes, Ionospheric propagation.

The non-uniform absorption of gyro-resonant microwave energy by an electron gas is used to produce the helical instability in gaseous magnetoplasmas. This helical instability is examined both theoretically and experimentally. Stability criteria for the existence of the helix and the dependence of the properties of the helix on the plasma parameters are derived from the two-fluid magnetohydrodynamic equations for electrons and ions. The experi-

mental examination of the instability is accomplished by the development of a suitable diagnostic procedure using low power (50 microwatt), non-resonant microwave sensing signals. The detailed examination of the properties of the helical instability verifies the theoretical predictions. Where it has been possible to measure the properties of the plasma discharge exactly, such as helix rotational frequency and discharge tube radius, excellent quantitative agreement between theory and experiment is found. Where it has only been possible to estimate the plasma parameters, such as electron temperature and longitudinal gradients, good qualitative agreement between theory and experiment is found. (Author)

AD-617 697 Div. 25/3, 25/6
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Los Angeles.
INVESTIGATIONS ON THE CONFIGURATIONAL EMF.
Final rept.,
by M. Chester. 20 Jun 65, 7p
Contract Nonr23372, Proj. NR017 458
Unclassified report

Descriptors: (*Voltage, Configuration), (*Field theory, Voltage), Transport properties, Harmonic analysis, Electric currents, Semiconductors, Silicon, Germanium, Tin, Superconductors.

The detection and measurement of a type of Bernoulli effect in the electron gas was undertaken in the following materials: silicon, germanium and superconducting tin. The technique employed for the semiconductors consisted in looking for harmonic voltage generation due to the physical constriction on the current flow imposed by the shape or configuration of the specimen.

AD-617 699 Div. 9/1, 30/2
CFSTI Prices: HC$5.00 MF$1.00

Univac Div., Sperry Rand Corp., St. Paul, Minn.
FLUID AMPLIFICATION. 12. BINARY COUNTER DESIGN.
Final rept.,
by T. A. Shook, T. F. Chen, and T. D. Reader.
30 Nov 64, 177p
Contract DA49 186AMC34X, Projs. 31100, DA1P01501A001
Unclassified report

Descriptors: (*Fluid flow, Amplifiers), (*Counting methods, Fluid flow), (*Amplifiers, Fluid flow), Control systems, Jets, Computer logic, Performance(Engineering), Theory, Analysis, Pressure, Digital systems.

The report is a detailed account of the work carried out by UNIVAC pursuant to Contract Number DA-49-186-AMC-34(X). It is of special interest in this contract to develop analytical tools which indicate circuit values in the construction of an all-fluid system, and which then predict its operating characteristics. In short, a circuit theory is to be formulated. An n-stage binary counter is selected for analysis, the foundations of which are the analogous equations of fluid flow and electrical current, and empirically formulated element characteristics. (Author)

AD-617 703 Div. 20/1, 15/1, 30/2
CFSTI Prices: HC$6.00 MF$1.50

C-E-I-R, Ltd., London (England).
THE CALCULATION OF ATOMIC WAVE FUNCTIONS BY SOLUTION OF THE HARTREE-FOCK EQUATIONS.
Final technical rept.,
by D. F. Mayers and A. J. Hirsh. Apr 65, 298p
Contract AF33 601 7261, Proj. 7112, Task 7112 02
ARL 65-62
Unclassified report

Descriptors: (*Atomic structure, Functions), (*Programming(Computers), Differential equations), (*Differential equations, Atomic structure), Atomic energy levels, Quantum mechanics, Integral equations, Iterative methods, Programming languages.

A program prepared for the IBM 7090 to solve the general form of the Hartree-Fock equations is described. The program is written in FORTRAN II except for three subroutines which are written in the FAP language. It is divided into four parts which contain:
I. Basic theory and method of numerical solution;
II. User's guide to the program;
III. Subroutine Specifications;
IV. Flow diagrams and listing. (Author)

AD-617 705 Div. 20/1, 15/1, 30/2
CFSTI Prices: HC$3.00 MF$0.75

C-E-I-R, Ltd., London (England).
THE USE OF MATHEMATICAL PROGRAMMING IN THE CALCULATION OF ATOMIC WAVE FUNCTIONS.
Final technical rept.,
by D. F. Mayers and F. O'Brien. Mar 65, 84p
Contract AF33 615 1339, Proj. 7112, Task 7112 02
ARL 65-51
Unclassified report

Descriptors: (*Atomic structure, Functions), (*Mathematical programming, Atomic structure), (*Differential equations, Atomic structure), (*Programming(Computers), Differential equations), Atomic energy levels, Silicon, Polarization, Potential theory, Integral equations.

The observed energy levels for Silicon + 3 have been fit by adding a polarisation term to the potential of the Hartree-Fock equation in a manner first used by Douglas. The resulting wave functions were used to calculate transition integrals for the allowed transitions and compared with the results using no polarisation term; the differences were of the order of a few percent. Results of calculations done on Silicon + 2 to determine the form of the polarisation term for the two-electron case are reported. The isoelectronic sequence from Sodium to Argon + 7 was examined to determine the possibility of predicting polarisation functions without knowledge of observed energy levels; difficulties in making the prediction are discussed. Changes in the numerical procedure for solving the Hartree-Fock equations are presented along with changes in the program for adding the polarisation term. (Author)

AD-617 717 Div. 25/4, 5/6
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.
FABRY-PEROT TYPE LASER MODULATORS.
Technical progress rept. for Jul 63-Jul 64,
by Donald G. McCauley. Apr 65, 45p
Rept. nos. TPR-386, NOTS-TP-3736
Unclassified report

Descriptors: (*Lasers, Modulators), (*Modulators, Lasers), (*Interferometers, Lasers), (*Light communication systems, Lasers), Piezoelectric effect, Oscillation, Quartz, Potassium compounds, Phosphates, Communication satellites(Passive), Crystal structure, Refractive index.

This report describes the optical characteristics of two prototype laser modulators having the thin, flat,

disk-shaped Fabry-Perot (F-P) interferometer design. The modulators are being used to investigate the use of laser radiation in communications. The report discusses the intensity modulation resulting both from the converse-piezoelectrically-induced oscillations in the physical separation of the interferometer reflectors and from the electrooptically-induced oscillations in the optical separation of the interferometer reflectors. (Author)

AD-617 724 Div. 25/7, 4/3
CFSTI Prices: HC$1.00 MF$0.50

Frick Chemical Lab., Princeton Univ., N. J.
RAMAN SPECTRA OF CRYSTALLINE CH4 AND CD4.
Technical rept.,
by A. Anderson and R. Savoie. Jul 65, 22p
Rept. no. TR-19
Contract Nonr 185827, Proj. NR019 143
Unclassified report

Descriptors: (*Roman spectroscopy, Methane), (*Methane, Deuterated compounds), Crystal lattices, Solidified gases, Cryogenics, Phase studies, Molecular rotation, Molecular spectroscopy.

The Raman spectra of crystalline CH4 and CD4 have been recorded in the temperature range 10 - 77K, which includes all three solid phases of CD4 and Phases I and II of CH4. Only three of the four Raman active fundamentals were observed in all cases and no lattice vibrations were seen. There are marked changes in the spectra at the transition Phase I -- Phase II, but only small differences between the spectra of Phases II and III of CD4. The spectra of Phase I are very similar to that of the liquid, suggesting that molecular rotation persists in the crystal at temperatures near the melting point. The structure of the fundamentals in Phase II is best interpreted in terms of a D2d space group. The more detailed spectrum for Phase III of CD4 may be indicative of a lower symmetry, but alternative explanations are briefly discussed. (Author)

AD-617 737 Div. 25/1, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
EFFECT OF A PLATE WITH DAMPING ON THE ACOUSTIC FIELD OF A POINT SOURCE.
Technical rept.,
by M. B. Friedman and M. K. Myers. Apr 65, 17p
Rept. nos. TR-37, CU-3-65-ONR-266(86)-CE
Contract Nonr26686, Proj. NR064 428
Unclassified report

Descriptors: (*Metal plates, Damping), (*Sound, Conductivity), Potential theory, Elasticity, Effectiveness.

A formal solution is obtained for the effect of a thin infinite plate with damping on the sound field due to a point source located a small distance from the plate in a uniform acoustic medium occupying the half-space on one side of the plate, with a vacuum on the other side. Damping is introduced by the use of a complex flexural rigidity in the equation of motion of the plate. Approximate expressions are derived for the sound conduction caused by the plate for small values of the damping coefficient. The results are compared with the corresponding known results for an elastic plate. It is shown that the conduction effect is reduced by the presence of damping in the plate. (Author)

AD-617 742 Div. 8/6
CFSTI Prices: HC$1.00 MF$0.50

Rome Univ. (Italy). Istituto di Elettronica.
MODES IN WAVEGUIDES FILLED WITH LONGITUDINALLY MAGNETIZED FERRITE.
Interim scientific rept., no. 1,
by Giorgio Gerosa. 28 Apr 65, 4p
Contract AF61 052 807
AFCRL 65-390
Unclassified report

Descriptors: (*Waveguides, Ferromagnetic materials), Mathematical analysis, Equations, Wave transmission, Electric fields, Magnetic fields.

A modal solution for a cylindrical waveguide of arbitrary cross section filled with longitudinally magnetized ferrite given by Ll. G. Chambers is criticized. (Author)

AD-617 744 Div. 25/7
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Research Labs., Pittsburgh, Pa.
MOLECULAR EXCITATION OF HYDROGEN AND NITROGEN FROM ELECTRON SWARM EXPERIMENTS.
Scientific paper,
by L. S. Frost and A. V. Phelps. 24 Mar 61, 21p
Rept. no. SP-908-3901-P1
Unclassified report

Descriptors: (*Molecular rotation, Hydrogen), (*Excitation, Nitrogen), Electron bombardment, Molecular properties, Cryogenics.

The energy distribution function of electrons in hydrogen and in nitrogen at 77 and 300K has been computed at values of the applied field to pressure ratio such that rotational excitation is the dominant energy loss process. The discrete nature of the energy loss occurring in a rotational excitation collision was included in the theory, as were collisions of the second kind with thermally excited molecules. The resulting values of drift velocity and characteristic energy, D/mu, were compared with the available experimental data, and adjustments made in the assumed curves of momentum transfer and rotational excitation cross section to improve the agreement. Curves are given of momentum transfer cross section vs energy in both gases which yield good agreement between theory and experiment, and conclusions are reached concerning the magnitude of the rotational excitation cross sections. (Author)

AD-617 768 Div. 9/4, 25/6
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics.
EFFECT OF A SHOCK WAVE ON A FLOATING RIGID-PLASTIC BOX STRUCTURE.
Technical rept.,
by R. B. Testa and H. H. Bleich. Apr 65, 46p
Rept. nos. TR-34, CU-2-65-ONR266(86)-CE
Contract Nonr26686, Proj. NR064 428
Unclassified report

Descriptors: (*Shock waves, Floating bodies), (*Hydrodynamics, Floating bodies), Plasticity, Deformation, Structures, Motion.

A method is presented to determine the deformations of a rigid-plastic box structure which floats on the surface of a fluid and contains an internal, elastically sup-

ported mass. The situation is a simple representation of a surface vessel in which plastic deformations resulting from an underwater shock greatly exceed the elastic deformations. The method is applied to the case of symmetric initial velocity distribution, excluding buoyancy effects. Numerical solutions for two simple initial velocities are obtained for the complete range of a significant parameter. The results indicate that when substantial plastic deformations occur, the solution consists of many phases, in each of which a certain group of plastic hinges is active. If the number of plastic hinges (and degrees of freedom) becomes large, the number of phases in a solution may become excessively large, and the conditions separating them are very complicated. (Author)

AD-617 781 Div. 8/6
CFSTI Prices: HC$2.00 MF$0.50

Colorado Univ., Boulder.
FIELD STRENGTH MEASUREMENTS IN A MULTIPATH FIELD USING LINEAR AND CIRCULAR PROBING.
Interim rept. for Nov 64-Feb 65,
by Raj Mittra and C. O. Stearns. Jun 65, 46p
Rept. no. TR-2
Contract AF30 602 2936, Proj. 4540, Task 454001
RADC TR-65-114 Unclassified report

Descriptors: (*Multipath transmission, Radio fields), (*Radio fields, Multipath transmission), (*Probes-(Electromagnetic), Multipath transmission), Radio transmission, Radio waves, Propagation, Radiofrequency power, Measurement, Resolution, Data processing systems, Numerical methods and procedures.

Techniques for resolving the components of a multipath field are investigated in this report. Both linear and circular probing schemes are discussed. Two methods for analyzing the linearly probed data are given, which are considerably simpler than the procedure followed by Watterson in an earlier report (Field strength measurements in a Multipath Field, NBS Report No. 7610 (Oct. 1962)). One of these is extended to the circular case. It is found that the resolution in the circular case is substantially poorer than for the linear scheme. (Author)

AD-617 783 Div. 25/3, 9/1
CFSTI Prices: HC$3.00 MF$0.75

Miami Univ., Coral Gables, Fla. Dept. of Physics.
MAGNETOFLUIDDYNAMIC VORTICES: CREATION AND INTERACTION.
Plasma physics bull. v. 5, no. 2,
by Robert Benach. Jun 65, 65p
Contract AT40 1 3293, Grant AF AFOSR 844 65
Unclassified report

Descriptors: (*Magnetohydrodynamics, Vortices), (*Vortices, Magnetohydrodynamics), Axially symmetric flow, Incompressible flow, Two-dimensional flow, Three-dimensional flow, Vector analysis, Partial differential equations.

Interest in magnetofluiddynamic vortex structures has led to an investigation of the creation and interaction of these structures. Vortex creation and interaction are considered for a case of axially symmetric and colinear flow in an incompressible fluid, securing explicitly the vorticity creation terms. (Author)

AD-617 790 Div. 25/8, 25/6, 25/3, 25/5
CFSTI Prices: HC$6.00 MF$1.25

Brussels Univ. (Belgium).
CONTRIBUTIONS IN NON-EQUILIBRIUM STATISTICAL MECHANICS AND THERMODYNAMICS.
Final technical rept. for Dec 61-Jun 64,
by I. Prigogine. 30 Jun 64, 232p
Grant AF EOAR62 16
AFOSR 65-1059
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Statistical mechanics, Irreversible processes), (*Thermodynamics, Statistical mechanics), Kinetic theory, Field theory, Perturbation theory, Plasma physics, Quantum statistics, Relativity theory, Transport properties, Hydrodynamics, Stability.

Apart from a thermodynamic study of the hydromagnetic stability problem for a system far from equilibrium, the essential matter of this report consists in a number of applications and extensions of the general statistical mechanical theory of irreversible processes previously developed. Generalized kinetic equations are obtained for non-uniform systems as for systems in external fields of arbitrary strength (classical case). The resulting expressions for the transport coefficients are analyzed and shown to be equivalent, at all orders in a perturbation expansion, to the forms obtained from the auto-correlation function formulae. The latter are further discussed for the quantum case. The study of an unstable plasma has exhibited the stabilization mechanism associated to the correlations; and the equation for an inhomogeneous plasma far from equilibrium has been derived. A rigorous statistical mechanical formulation is given for the hydrodynamics of a relativistic plasma. (Author)

AD-617 792 Div. 25/6, 25/7
CFSTI Prices: HC$3.00 MF$0.75

Massachusetts Inst. of Tech., Cambridge.
SOLID-STATE AND MOLECULAR THEORY GROUP.
Quarterly progress rept. no. 57.
15 Jul 65, 68p
Contracts Nonr184134, AF19 628 356
Unclassified report

Descriptors: (*Solid state physics, Molecular properties), (*Molecular properties, Solid state physics), Molecular association, Potassium compounds, Chlorides, Atomic energy levels, Beryllium, Atomic orbitals, Field theory, Crystal structure, Integrals, Transition temperature, Impurities, Superconductors.

Contents: Cohesive Energy of KC1; The Band Structure of Beryllium; Symmetry Orbitals, Closed Shell Interactions, and Crystal Field Potential for Some Molecular Clusters; Magnetic Impurity Effect on Superconductor Transition Temperature - Extension of Nakaoka's Theory.

AD-617 801 Div. 20/1

Connecticut Univ., Storrs. Dept. of Physics.
THREE DISCRETE Q VALUES IN Ar(+)-Ar COLLISIONS,
by Quentin C. Kessel, Arnold Russek, and Edgar Everhart. 25 Feb 65, 3p
AROD 2805:12
Unclassified report

Pub. in Physical Review Letters v14 n13 p484-6 Mar 29 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Argon, Ions), (*Excitation, Argon), (*Inelastic scattering, Excitation), Energy, Electron transitions.

AD-617 806 Div. 9/1

Massachusetts Inst. of Tech., Cambridge. Dept. of Mathematics.
THE FLOW INDUCED BY A DISK OSCILLATING IN ITS OWN PLANE,
by D. J. Benney. 9 Sep 63, 7p
Unclassified report

Research supported in part by Office of Naval Research, Washington, D. C.
Pub. in Journal of Fluid Mechanics v18 pt3 p385-91 1964 (Copies available only to DDC users).

Descriptors: (*Fluid flow, Oscillation), (*Disks, Fluid dynamic properties), Boundary layer, Diffusion, Differential equations, Numerical analysis, Iterative methods.

The flow field due to the oscillations of a disk is governed largely by diffusion near the boundary, but the inertia forces cannot be neglected at large distances. The solution is obtained as a single expansion for the case when the disk is performing small-amplitude sinusoidal oscillations. (Author)

AD-617 807 Div. 9/1

Massachusetts Inst. of Tech., Cambridge. Dept. of Mathematics.
NEUTRAL CURVES AND STABILITY BOUNDARIES IN STRATIFIED FLOW,
by Louis N. Howard. 29 Jan 63, 11p
Unclassified report

Pub. in Journal of Fluid Mechanics v16 pt3 p333-42 1963
(Copies available only to DDC users).

Descriptors: (*Fluid flow, Stability), (*Perturbation theory, Fluid flow), Numerical analysis, Boundary value problems.

An example is presented which shows that the boundary of stability in an antisymmetric stratified shear flow is not necessarily marked by steady neutral waves with c = 0. The stability characteristics of stratified shear flow in the neighbourhood of the neutral curve are also discussed. (Author)

AD-617 812 Div. 20/1, 25/3, 25/6

Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
QUANTUM OSCILLATIONS IN THE ULTRASONIC ATTENUATION AND MAGNETIC SUSCEPTIBILITY OF ARSENIC,
by Y. Shapira and S. J. Williamson. 14 Dec 64, 2p
Grant AF EOAR64 24
AFOSR 65-0759
Unclassified report

Research done in cooperation with National Magnet Lab., Mass. Inst. of Tech., Cambridge.
Pub. in Physics Letters v14 n2 p73-4 Jan 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Arsenic, Atomic energy levels), (*Magnetic properties, Arsenic), (*Ultrasonic radiation, Attenuation), Oscillation, Quantum mechanics, Symmetry(Crystallography).

AD-617 818 Div. 25/2

Columbia Univ., New York. School of Mines.
CRYSTALLOGRAPHY OF DISLOCATIONS AND DISLOCATION LOOPS IN DEFORMED IRON,
by S. M. Ohr and D. N. Beshers. 12 Mar 64, 12p
Unclassified report

Pub. in Philosophical Magazine v10 n104 p219-30 Aug 1964(Copies available only to DDC users).

Descriptors: (*Iron, Crystal lattice defects), (*Crystal lattice defects, Iron), Electron microscopy, Electron diffraction analysis, Deformation.

Crystallographic analyses of dislocations and dislocation loops in deformed b.c.c. iron observed in the electron microscope have been carried out by applying the electron diffraction theory of contrast at dislocations. Dislocations in deformed iron are in the form of tangles, with interspersed clusters of dislocation loops, from the very first stage of deformation. Crystallographic analyses show that the tangles consist of dislocations of two distinct Burgers vectors, in the ratio of approximately two to one. The dislocations of the primary system are composed of segments of both signs, in roughly equal proportion. The Burgers vector of a majority of dislocation loops is identical to that of the primary dislocations, and the rest of the loops belong to the secondary system. The loops are found to be pure edge prismatic dislocations lying in (111) planes, and are identified as being of vacancy type. From a consideration of the elastic theory of defect interaction, it is concluded that the interactions of dislocations with dislocations of dissimilar Burgers vectors and the formation of a cluster of small loops around the dislocations and junctions are responsible for formation of dislocation tangles. (Author)

AD-617 826 Div. 25/8, 4/4

Vermont Univ., Burlington. Dept. of Physics.
THREE-DIMENSIONAL SECOND VIRIAL COEFFICIENT IN PHYSICAL ADSORPTION,
by John E. Krizan. 9 Nov 64, 5p
Contract DA31 124ARO D172
AROD 4403:3C
Unclassified report

Pub. in Journal of Chemical Physics v42 n8 p2923-7 Apr 15 1965 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Adsorption, Equations of state), (*Argon, Adsorption), (*Carbon black, Adsorption), Potential theory, N-body problem, Surface properties, Molecular interactions, Thermodynamics.

Expressions are obtained for the three-dimensional second virial coefficient in physical adsorption for a system in which the adsorbed particles interact via Lennard-Jones forces plus the three-body force derived by Sinanoglu and Pitzer. Using these expressions one can investigate the relative importance of the three-dimensional effect of the three-body force. For the particular system of argon on carbon black it is found that the two-dimensional approximation is very good. (Author)

AD-617 828 Div. 25/2

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Physics.
TUNGSTEN (110) SURFACE CHARACTERISTICS IN LOW-ENERGY ELECTRON DIFFRACTION,
by R. M. Stern. 24 Sep 64, 5p

Contract AF49 638 1369, Proj. 9761, Task 976103
AFOSR 65-0774

Unclassified report

Pub. in Applied Physics Letters v5 n11 p218 Dec 1 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Tungsten, Electron diffraction analysis), (*Electron diffraction analysis, Tungsten), Crystals, Surface properties, Impurities, Carbon, Crystal lattices, Adsorption, Oxygen, Crystal structure.

This investigation studies the diffraction patterns of tungsten (110) surfaces of crystals. When observed in post accelerated low-energy electron diffraction, the surfaces do not exhibit the expected diffraction pattern. Instead, 3 different patterns are seen: a basic pattern having twofold symmetry, its mirror image, and a superposition of the 2 patterns. This results from an impurity in the crystal which is shown to be carbon. Two possible structures are proposed which would give rise to the 3 patterns: a super-lattice consisting of the points of coincidence of a regular (110) plane mesh with one which has been slightly distorted and rotated by the carbon impurity, and a stable tungsten-carbon compound. The adsorption of oxygen on the tungsten (110) surface is also discussed.

AD-617 834 Div. 25/2, 30/3

Pennsylvania State Univ., University Park. Dept. of Physics.
FIELD ION MICROSCOPY OF RHENIUM,
by Erwin W. Muller. 1962, 4p
Grant AF AFOSR62 96, Proj. 9761, Task 976103
AFOSR 65-0778

Unclassified report

Pub. in Proceedings European Regional Conference on Electron Microscopy (3rd), Prague, Czechoslovakia p161-2 1964 (Copies available only to DDC users).

Descriptors: (*Rhenium, Microscopy), (*Microscopy, Rhenium), Wires, Crystal lattice defects, Crystal structure, Electron microscopy.

This note examines the ion microscopic image of rhenium. Features of the ion image discussed are the evaporation field at 20K, the intensity alternation of net plane rings around the 0001 pole, the decoration by bright atoms of six (2110) zone lines emerging radially from the 0001 plane, the existence of a high dislocation density in a concentric area 20 to 30 degrees of the c-axis, and the adsorption of residual gas. Illustrations of ion images of rhenium are presented.

AD-617 842 Div. 25/2

Royal Military Coll. of Canada, Kingston (Ontario).
THE FORCE CONSTANTS OF GERMANIUM. A21,
by N. K. Pope. 1963, 12p
Grant DRB9510 30

Unclassified report

Pub. in Lattice Dynamics. Proceedings of the International Conference, held at Copenhagen, Denmark, August 5-9, 1963 (Copies available only to DDC users).

Descriptors: (*Germanium, Crystal lattices), (*Crystal lattices, Vibration), Force(Mechanics), Stresses, Elasticity, Least squares method, Fourier analysis.

The Born-von Karman Theory of the diamond-type crystal has been developed, taking into account interactions between each atom and all its neighbours out to the sixth. Explicit expressions, in terms of the force constants, are given for the frequencies and eigenvectors for normal modes with wave vectors in the symmetry directions and for the elastic constants. A non-linear least squares fit to the elastic constants and measured dispersion curves in the symmetry directions shows that it is necessary to take fifth-neighbour interactions into account in order to represent the data. Statistically significant values for the force constants were found only for first neighbour interactions and possibly three others. It is shown that the Fourier components of the elements of the dynamical matrix in reciprocal space can be obtained by Fourier analysing certain linear combinations of the dispersion curves in the symmetry directions. Further, all the linearly independent combinations of force constants which can be obtained from this data are given directly in terms of the Fourier coefficients. Certain necessary conditions on the Fourier coefficients are also derived. The present experimental data is not sufficiently complete to determine such a set of Fourier coefficients. (Author)

AD-617 848 Div. 9/1

University of Southern California, Los Angeles.
THE EXISTENCE OF SYMMETRIC STEADY FLOWS NEAR CRITICAL SPEED,
by D. H. Hyers and W. T. Kyner. 5 Jun 63, 20p
Contract Nonr22809, Proj. NR041 152

Unclassified report

Pub. in Archive for Rational Mechanics and Analysis v14 n4 p264-82 1964 (Copies available only to DDC users).

Descriptors: (*Fluid flow, Potential theory), Boundary value problems, Green's function, Integral equations, Gravity, Velocity.

AD-617 855 Div. 25/6, 15/1

Imperial Coll. of Science and Tech., London (England).
ON THE METHODS OF GALERKIN, RITZ AND KRYLOV-BOGOLIUBOV IN THE THEORY OF NON-LINEAR VIBRATIONS.
Revised ed.,
by D. E. Newland. 5 Aug 64, 17p
AFOSR 65-1014

Unclassified report

Pub. in International Journal of Mechanical Sciences v7 n3 p159-72 1965. Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge, under Grant AF AFOSR154 63 (Copies available only to DDC users.) Revision of manuscript submitted 5 Jun 64.

Descriptors: (*Vibration, Theory), (*Numerical methods and procedures, Vibration), Perturbation theory, Differential equations, Motion.

The conditions for equivalence of the Galerkin method and the Ritz minimizing method are reviewed. It is then shown that Galerkin's method may also lead to a result which, for steady state vibrations, is the same as the first approximation of Krylov-Bogoliubov. Both the Ritz method and the first approximation of Krylov-Bogoliubov may therefore be thought of as special cases of the general Galerkin method. The difference between them lies in the different ways in which the describing differential equations are expressed, in the different forms of the approximate solution used, and in the different choice of Galerkin weighting functions. As an example of these differences, the free vibration of a centrifugal pendulum is considered. This is a two degrees-of-freedom problem with a known exact solution. The exact solution is compared with approximate solutions by the Ritz minimizing

method and the method of Krylov-Bogoliubov. It turns out that the two methods give results which are practically indistinguishable from each other, and very close to the exact answer. (Author)

AD-617 861 Div. 20/2

Carnegie Inst. of Tech., Pittsburgh, Pa.
LOG ft FOR ALLOWED INNER BETA GROUPS FROM ODD-ODD ISOTOPES,
by S. Jha and A. S. Johnston. 1964, 4p
Grant AF AFOSR278 63
AFOSR 65-0817
Unclassified report

Pub. in Comptes Rendus du Congres International de Physique Nucleaire held at Paris, 2-8 Jul 64 v2 p1183-5 1964 (Copies available only to DDC users).

Descriptors: (*Beta decay, Odd-odd nuclei), (*Odd-odd nuclei, Beta decay), Positrons, Annihilation reactions, Beat-ray spectrum, Isotopes.

AD-617 863 Div. 20/2

Carnegie Inst. of Tech., Pittsburgh, Pa.
LOW-LYING LEVELS OF EVEN-EVEN XENON ISOTOPES,
by S. Jha, A. S. Johnston, T. D. Nainan, J. L. Power, and R. F. Leonard. 1964, 3p
Grant AF AFOSR278 63
AFOSR 65-0819
Unclassified report

Research done in cooperation with National Aeronautics and Space Administration, Cleveland, Ohio, Lewis Research Center. Pub. in Comptes Rendus du Congres International de Physique Nucleaire held at Paris, 2-8 Jul 64 v2 p458-9 1964 (Copies available only to DDC users).

Descriptors: (*Nuclear energy levels, Xenon), (*Xenon, Even-even nuclei), Isotopes, Cesium, Decay schemes.

AD-617 867 Div. 25/6

Paris Univ. (France).
TUNNELING INTO DIRTY SUPERCONDUCTORS NEAR THEIR UPPER CRITICAL FIELDS,
by E. Guyon, A. Martinet, J. Matricon, and P. Pincus.
7 Dec 64, 7p
Unclassified report

Pub. in Physical Review v138 n3A pA746-52 May 3 1965 (Copies not available to DDC or Clearinghouse customers). Supported by General Electric Co. and Direction des Recherches et Moyens d'Essais.

Descriptors: (*Tunneling(Electronics), Superconductors), (*Superconductors, Tunneling(Electronics)), Magnetic fields, Excitation, Electric currents, Voltage, Cryogenics, Tin alloys, Indium alloys, Lead alloys, Bismuth alloys.

Experiments are described on tunneling into SnIn and PbBi alloys near their upper critical fields. In this regime, a theory by de Gennes predicts gapless superconductivity with a density of excited states whose energy scale is field-independent. This density of states is investigated in detail, both in the superconducting sheath regime near field parallel to the surface and in the vortex regime near field normal to the surface. We find excellent agreement between theory and experiment for the shape of the tunneling characteristic and reasonable agreement for its normalization. (Author)

AD-617 872 Div. 20/2

Enrico Fermi Inst. for Nuclear Studies, Univ. of Chicago, Ill.
HYPERFRAGMENT PRODUCTION BY 4.5 GEV/C PI-MESON INTERACTIONS IN EMULSION NUCLEI. A REAPPRAISAL,
by J. Zakrzewski, D. H. Davis, and O. Skjeggestad.
16 Aug 62, 8p
Contract AF49 638 209, Proj. 9751, Task 975101
AFOSR 65-0836
Unclassified report

Pub. in Il Nuovo Cimento s10 v27 p652-9 Feb 1 1963 (Copies available only to DDC users).

Descriptors: (*Hyperons, Meson reactions), (*Pions, Meson reactions), Nuclei, Photographic emulsions, Nuclear models.

The hyperfragment production by fast pi-meson interactions is shown to be well explained by the model of Jones et al. In particular, the short-range hyperfragments are shown to be predominantly very heavy and not light as had been supposed. The conclusions of Silverstein, Fry et al and Lokanathan et al, are critically examined with recourse to this fact. (Author)

AD-617 875 Div. 25/8, 25/6, 9/1

Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
THE GROWTH OF A DEPOSITED LAYER ON A COLD SURFACE.
Revised ed.,
by Paul A. Libby and Shun Chen. 19 Oct 64, 9p
Contract AF33 657 8286
ARL 65-158
Unclassified report

Pub. in Heat and Mass Transfer v8 p395-402 1965 (Copies available only to DDC users).
Revision of manuscript submitted 24 Jul 64.

Descriptors: (*Condensation, Gas flow), (*Cryogenics, Condensation), (*Gas flow, Condensation), (*Heat transfer, Condensation), Thermal conductivity, Phase studies, Laminates, Surfaces, Boundary layer control, Supersonic wind tunnels, Geophysics, Compressors.

An approximate analysis of the growth of, and the temperature within, a deposit which may occur in a cold surface in a gas stream is developed with the convective heat transfer to the surface of the deposit taken into account. Simple 'short time' and 'long time' solutions are obtained. A numerical example which may be of interest in connection with cryogenic surfaces in a hypersonic wind tunnel is presented. (Author)

AD-617 876 Div. 25/2

California Inst. of Tech., Pasadena. Div. of Chemistry and Chemical Engineering.
IMPROVED APPROXIMATION FOR INCOHERENT X-RAY SCATTERING,
by S. E. Rodriguez and C. J. Pings. 14 Oct 64, 2p
Unclassified report

Pub. in Acta Crystallographica v18 pt5 p979-80 May 1965 (Copies available only to DDC users).

Descriptors: (*X-ray diffraction analysis, Incoherent scattering), Numerical methods and procedures, Quantum mechanics, X-rays, Scattering.

AD-617 878 Div. 20/2

Stanford Univ., Calif.
GAMMA TRANSITIONS TO THE 16.6- AND 16.9-MeV STATES IN Be8,
by D. Kohler and P. Paul. 22 Feb 65, 3p
Contracts Nonr22519, Nonr22575
Unclassified report

Pub. in Physics Letters v15 n2 p157-9 Mar 15 1965
(Copies available only to DDC users).

Descriptors: (*Gamma emission, Nuclear energy levels), (*Nuclear energy levels, Beryllium), (*Beryllium, Nuclear energy levels), Excitation, Nuclear resonance, Alpha decay, Nuclear spectroscopy.

AD-617 883 Div. 25/3, 25/1, 9/1
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
A LOW DENSITY UNIVERSAL INSTABILITY,
by F. C. Hoh. Dec 64, 20p Rept. no. D1-82-0395
Unclassified report

Also available from the author.

Descriptors: (*Plasma physics, Magnetohydrodynamics), (*Magnetohydrodynamics, Acoustics), (*Acoustics, Magnetohydrodynamics), Ions, Mechanical waves, Propagation, Configuration, Complex variables, Potential theory.

It is shown that an ion acoustic wave in a low pressure, non-uniform plasma propagating almost perpendicular to the external magnetic field, is made unstable when finite Debye length is introduced. In connection with this problem, the WKB method, extended to complex potential, as well as the meaning of localized dispersion relations are considered in detail. It is pointed out that, while the localized frequency and growth rate depend upon the slope of the profile, the true values depend sensitively on the curvature of the density profile. (Author)

AD-617 890 Div. 25/6
CFSTI Prices: HC$4.00 MF$0.75

Illinois Univ., Urbana. Dept. of Theoretical and Applied Mechanics.
PHOTOELASTIC STUDY OF THE STRESSES NEAR OPENINGS IN PRESSURE VESSELS,
by C. E. Taylor and N. C. Lind.
Mar 65, 101p Rept. no. T/AM-270
Contracts Nobs72069, Nobs86112
Unclassified report

Descriptors: (*Photoelasticity, Pressure vessels), (*Pressure vessels, Stresses), (*Stresses, Pressure vessels), Model tests, Experimental data, Mathematical analysis, Load distribution, Nozzles, Test methods, Structures, Spheres, Cylindrical bodies, Structural shells, Surface properties.

The report describes the experimental techniques used in the study, presents the results, and discusses the probable accuracy.

AD-617 891 Div. 9/1
CFSTI Prices: HC$3.00 MF$0.75

Gas Dynamics Lab., Princeton Univ., N. J.
MASS INJECTION IN A HYPERSONIC CAVITY FLOW,
by Kenneth M. Nicoll. May 65, 80p
Contract AF33 615 1079, Proj. 7063, Task 706303
ARL 65-90
Unclassified report

Descriptors: (*Hypersonic flow, Cavitation), (*Cavitation, Hypersonic flow), Injection, Helium, Gas flow, Heat transfer, Wind tunnels, Fluid mechanics.

The present report describes an experimental investigation of a hypersonic cavity flow with mass-injection into the separated-flow region. The experiments were carried out in a helium wind-tunnel at a free-stream Mach number of eleven. The injected gas was helium. Two parameters were varied during the study -- the mass injection rate and the height of the separation shoulder relative to the reattachment shoulder. The effects of these parameters on the distributions of pressure and heat transfer rate were investigated. Mass injection appeared to have no drastic effect on transition Reynolds number, and the cavity flow is believed to have been laminar throughout the present investigation. The effect on the cavity floor pressure of raising the separation shoulder relative to the reattachment shoulder was of the same order as the effect of mass injection, the two effects being virtually independent of one another. However, the flow in the immediate vicinity of the reattachment shoulder and downstream was primarily controlled by mass injection rate. Small amounts of mass injection were capable of completely removing the pressure peak at reattachment, and could produce a flow with almost constant pressure within and downstream of the cavity. Mass injection had a pronounced effect on the heat transfer rate in the vicinity of reattachment, and reductions of as much as a factor of six were obtained in the heat transfer peak in this region. Furthermore, the heat transfer rates up to about one cavity length downstream of the reattachment shoulder were reduced by as much as a factor of three by mass injection within the cavity. (Author)

AD-617 898 Div. 25/3, 8/6
CFSTI Prices: HC$1.00 MF$0.50

Innsbruck Univ. (Austria).
MHD CHARACTERISTICS AND DISPERSION RELATION FOR FINITE ELECTRICAL CONDUCTIVITY.
Scientific rept.,
by Helmut Friedel. 13 Mar 65, 15p Rept. no. SR-23
Contract AF61 052 675
AFOSR 65-1313
Unclassified report

Descriptors: (*Magnetohydrodynamics, Electrical conductivity), (*Electrical conductivity, Magnetohydrodynamics), (*Electromagnetic waves, Propagation), Differential equations, Plasma medium, Matrix algebra, Austria.

MHD characteristics are investigated for the case of finite electrical conductivity in connection with dispersion relations of linear waves. The basic equations are no longer total hyperbolic but parabolically or elliptically degenerated. The nature of the characteristic directions for the degenerated MHD basic equations are explained. (Author)

AD-617 899 Div. 20/1, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
RELATIVISTIC MOTION AND ENERGY GAIN OF CHARGED PARTICLES IN A STANDING WAVE NEAR CYCLOTRON RESONANCE,
by Richard B. Hall. Dec 64, 24p
Rept. no. D1-82-0388
Unclassified report

Also available from the author.

Descriptors: (*Charged particles, Motion), (*Radio waves, Charged particles), Energy, Relativity theory, Cyclotron resonance phenomena, Cyclotron waves, Electromagnetic fields, Plasma physics, Differential equations.

The relativistic equations of motion of a charged particle in an R.F. standing wave and a uniform d.c. magnetic field are solved by use of a computer. Curves of energy gain, ratios of transverse to longitudinal energy, and interaction times are found for particles that either are reflected from or pass through the R.F. field. Some of the effects of relativistic mass increase are found to be predicted by a simple modification of the time-averaged theory. It is proved that, after its interaction with an R.F. field with a space variation only along the dic. magnetic field, that the guiding center of the charged particle remains unchanged. (Author)

AD-617 906 Div. 20/1, 25/3
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs, Seattle, Wash.
ENERGY GAIN OF A LOW-ENERGY CHARGED PARTICLE IN A STANDING WAVE NEAR CYCLOTRON RESONANCE,
by Richard B. Hall. Dec 64, 24p
Rept. no. D1-82-0389
Unclassified report

Also available from the author.

Descriptors: (*Charged particles, Energy), (*Radio waves, Charged particles), Gain, Cyclotron resonance phenomena, Cyclotron waves, Relativity theory, Plasma physics, Motion, Differential equations.

Approximate expressions are derived for the energy gain of a charged particle as a result of either being reflected from or of passing entirely through an R.F. standing wave. It is shown that energy gain is obtained only when a d.c. magnetic field is present and commences further from cyclotron resonance as the R.F. field amplitude increases. The exact equations of motion are numerically solved and curves showing energy gain, ratios of perpendicular to longitudinal energy and the time required for reflection are obtained. It is found that the approximate analysis predicts closely the actual phenomena. (Author)

AD-617 907 Div. 25/4, 30/3
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DEVICE FOR AUTOMATIC CHANGING OF THE MAGNETIC FIELD OF A MASS SPECTROMETER,
by V. I. Zubkov and A. M. Ivanov. 9 Jul 65, 6p
Rept. no. FTD-TT-65-491
TT 65-62616
Unclassified report

Unedited rough draft trans. of Patent (USSR) 156 713, appl. no. 783488/26-10, 20 Jun 62. Available copy will not permit fully legible reproduction. Reproduction will be made if requrested by users of DDC. Copy is available for public sale.

Descriptors: (*Mass spectroscopy, Spectrum analyzers), (*Spectrum analyzers, Mass spectroscopy), Servomechanisms, Magnetic fields, Control systems, Electronic recording systems, USSR.

The device consists of a reversible electric motor, a reducer, regulating disks, and detailed parts of hand adjustment. The distinguishing feature of the device is that for the purpose of eliminating the idle running of the scanning and assuring a continuous recording of the spectrum there is used a relay throw-over in the direction of the motor's turning and the potentiometer contacts.

21. Propulsion and Fuels

AD-617 272 Div. 10/6
CFSTI Prices: HC$1.00 MF$0.50

Atlantic Research Corp., Alexandria, Va.
RESEARCH ON THE DEFLAGRATION OF HIGH-ENERGY SOLID OXIDIZERS.
Quarterly technical summary rept. no. 11, 1 Dec 64-28 Feb 65,
by J. B. Levy. 19 May 65, 19p
Contract AF49 638 1169

Unclassified report

Descriptors: (*Solid rocket oxidizers, Deflagration), (*Deflagration, Solid rocket oxidizers), (*Hydrazine, Deflagration), Flames, Temperature, Thermocouples, Decomposition, Hydrazine derivatives, Perchlorates, Pressure, Chemical analysis.

Further experiments have been performed in which the flame temperature above deflagrating hydrazine diperchlorate has been measured with fine thermocouples. A flame temperature of about 1350K is indicated for an ambient pressure of about 20 atmospheres. This is substantially below the theoretical flame temperature of about 1600K. The thermal decomposition of hydrazine diperchlorate has been investigated from 211-291C. The rates of thermal decomposition have been examined and indicate a complex process. Preliminary experiments have been performed on the thermal decomposition of hydrazine diperchlorate-copper chromite mixtures. Ammonium perchlorate has been found in the surface of a strand of hydrazine diperchlorate which had been ignited at an elevated pressure, allowed to deflagrate partially and extinguished by sudden pressure release. Deflagration rate measurements from six to one hundred and thirty atmospheres are reported for pressed hydrazine diperchlorate.

AD-617 281 Div. 27/2

North Dakota Univ., Grand Forks.
INVESTIGATION ON THE PERFORMANCE CHARACTERISTICS OF THE VALVELESS PULSE JET.
Master's thesis,
by Roger W. Engebretson. Feb 65, 61p

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Pulsejet engines, Performance-(Engineering)), Valves, Thrust, Fuel consumption, Exhaust pipes, Configuration, Operation, Design.

The primary objective of the investigation was to provide detailed information of the performance characteristics of the valveless pulse jet. Data include the thrust output, the frequency of operation, the air fuel ratio, and the specific fuel consumption. A secondary objective was to determine what effect the location and size of the intake had upon the performance characteristics. The effects of minor changes in the exhause pipe configuration were also investigated.

AD-617 314 Div. 27/3, 25/6
CFSTI Prices: HC$3.00 MF$0.75

Air Force Flight Dynamics Lab., Research and Technology Div., Wright-Patterson AFB, Ohio.
ACTIVE CONTROL OF BOOSTER ELASTICITY.
Final rept. for Oct 63-Aug 64,
by Robert L. Swaim. Apr 65, 82p
Rept. no. FDL TR-64-189
Proj. 8219, Task 821901

Unclassified report

Descriptors: (*Booster motors, Elasticity), (*Flight control systems, Booster motors), Flexible structures, Launch vehicles(Aerospace), Aeroelasticity, Perturbation theory.

An investigation was made of the problem of providing an automatic control system for a large booster subject to severe mode interaction. This interaction is defined as a strong aerodynamic coupling between the rigid-body motion and one or more elastic modes of the vehicle and can appear as a flutter phenomenon between rigid and elastic degrees of freedom as opposed to 'classical' flutter between two or more elastic degrees of freedom. For the booster considered, the interaction resulted in a rigid-body mode static divergence for an aerodynamically, statically stable, rigid configuration in the uncontrolled or forward-loop-only system. It was shown that preliminary control system design must include the significant elastic modes when mode interaction is present. A rigid-body-only synthesis will not yield 'ball-park' values for the control element gains. The investigation revealed that the active control philosophy of using auxiliary control inputs to increase the frequencies of the elastic modes sufficient to reduce the mode of interaction in the forward-loop is a false notion. It is the free-free bending modes which interact with the rigid-body motion, and input forces cannot alter their mode shapes and frequencies. They can be altered only by mass and structural stiffness changes to the basic vehicle. The input forces result in changes to elastic mode coupled frequencies and damping ratios which do not affect the mode interaction phenomenon as defined in this report. (Author)

AD-617 368 Div. 27/3, 27/2, 9/1, 25/6
CFSTI Prices: HC$1.00 MF$0.50

Jet Propulsion Center, Purdue Univ., Lafayett, Ind.
AN INVESTIGATION OF TWO-PHASE GAS-LIQUID MIXTURES FLOWING IN VARIABLE AREA DUCTS. PART A. NOZZLE FLOWS. PART B. DIFFUSER FLOWS,
by D. L. Crabtree, G. R. Schneiter, and S. N. B. Murthy. 1963, 19p

Unclassified report

Descriptors: (*Nozzles, Fluid dynamic properties), (*Diffusers, Fluid dynamic properties), (*Fluid dynamic properties, Ducts), Liquid jets, Rocket motor nozzles, Mixtures, Bubbles, Compressible flow, Drops, Jet pumps, Momentum, Heat transfer, Transport properties, Geometry.

The research concerns the experimental and theoretical studies of the flow of a predominantly liquid two-phase fluid in nozzles and diffusers, undertaken as part of a long-range program dealing with the development of a gas-driven jet pumpt for rocket engines. The physical description of the flow is based on momentum, heat, and mass transfer phenomena, droplet mechanics, and the influence of flow geometry and operating conditions. As the mass ratio of one of the components is increased, it is imperative to consider at least some aspects of the discreteness of the component of lower volume in mass and energy transfer processes in a theoretical analysis for a first-order prediction of velocities, droplet diameters, and pressure for the flow in an accelerating or nozzle flow and a decelerating or diffuser flow. In the nozzle experiments, the total flow rate and the mass ratio of liquid to gas were varied to establish a series of design and performance parameters.

The experimental investigation for diffusing flows was performed employing a conical diffuser and a predominantly liquid medium with the gas in the form of small bubbles dispersed in the liquid. The objects of the research were to determine the feasibility of diffusing a free jet to liquid and the effect of gas entrained in the flowing liquid. (Author)

AD-617 531 Div. 10/4, 10/7, 13/11
CFSTI Prices: HC$1.00 MF$0.50

Naval Research Lab., Washington, D. C.
EXPLOSION HAZARDS OF MIXED HYDRAZINES FUEL.
Final rept.,
by H. E. Moran, Jr., J. C. Burnett, and E. I. Smith, Jr.
May 65, 23p NRL Memo. rept. 1615

Unclassified report

Descriptors: (*Liquid rocket fuels, Explosions), (*Hydrazines, Explosions), (*Explosions, Liquid rocket fuels), Methyl hydrazines, Hydrazine derivatives, Heating, Combustion, Detonations, Autoignition, Temperature, Impurities, Fire safety.

MHF type fuels were examined for their tendency to explode when heated or burned. Heating the fuels (without burning) regularly produced explosions ranging from light to very strong. Only one burning test out of nearly one hundred resulted in an explosion. This was probably a detonation. Container materials, additives, and changes in the external environment had relatively little effect on the course of the burning. The temperature records showed that the nonburning fuels reached a temperature in the vicinity of 300C before exploding. Burning fuels, on the other hand, generally changed to auto-oxidation (flare burning) at temperatures between 100 and 200C and apparently were consumed before reaching the explosion temperature. The one burning test that resulted in an explosion appeared normal up to the moment of the explosion. No explanation is apparent for this test result. (Author)

AD-617 620 Div. 27/2, 9/7
CFSTI Prices: HC$2.00 MF$0.50

Cincinnati Univ., Ohio.
PRESSURE RECOVERY MEASUREMENTS ACROSS A TWO-DIMENSIONAL HYPERSONIC INLET WITH VARIABLE GEOMETRY.
Interim rept. for Dec 63-Jul 64,
by Widen Tabakoff and James D. McDonel. May 65, 43p
Contract AF33 616 8453, Proj. 7064
ARL 65-93

Unclassified report

Descriptors: (*Ramjet engines, Combustion chambers), (*Ramjet inlets, Pressure), (*Hypersonic characteristics, Ramjet inlets), Hypersonic diffusers, Hypersonic wind tunnels, Two-dimensional flow, Geometry, Measurement, Aerodynamic configurations, Transducers, Simulation.

The report describes the experimental measurement of pressure recovery across a simulated combustion chamber duct of a two-dimensional hypersonic inlet with variable geometry. The model tested was a wedge type inlet which generated a single external shock wave. The program was conducted in the twenty-inch hypersonic wind tunnel. Testing was at a nominal free stream Mach number of 14 and free stream Reynolds number of 721,000 per foot. (Author)

AD-617 621 Div. 27/3
CFSTI Prices: HC$3.00 MF$0.75

Huyck Research Center, Stamford, Conn.
ANALYSIS OF THRUST AND FLOW AUGMENTATION OF A COANDA NOZZLE.
Final rept.,
by E. L. Victory. May 65, 62p
Rept. no. HRC-021-2
Contract AF33 657 11697, Proj. 7065
ARL 65-86

Unclassified report

Descriptors: (*Thrust augmentor nozzles, Performance(Engineering)), (*Coanda effect, Thrust augmentor nozzles), Momentum, Thrust, Lift, Jets, Boundary layer, Graphics.

In order to evaluate the performance of a Coanda Nozzle and to determine its thrust and pumping capabilities, a series of tests were conducted on a Coanda Nozzle. The results showed that the nozzle was capable of creating thrust augmentation of about 1.25. Furthermore, it was also shown that the Coanda Nozzle, through the creation of a low pressure zone along the Coanda surface, was capable of augmenting the momentum of the primary by a factor of approximately 1.7. By measuring the velocity profile at the exit of the nozzle, the pumping capability of the nozzle as defined by the flow augmentation ratio was calculated and determined to be inversely proportional to the slot size, while reaching a maximum at plenum pressures ranging from 150 to 180 cm. Hg. Based on the experiments carried out on other nozzles, it has been shown that the momentum and flow augmentation reach their greatest value for slot sizes smaller than possible with the nozzle furnished by the Air Force. The results confirmed the conclusion that this particular configuration of the Coanda nozzle is not optimum for purposes of producing high static thrust. (Author)

AD-617 661 Div. 27/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
MASS OF A SHAFT AND ITS EFFECT ON THE CRITICAL ANGULAR VELOCITIES OF TURBINE ROTOR,
by K. A. Kryukov. 12 May 65, 14p
Rept. no. FTD-TT-64-1054
TT 65-62576

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n4 p101-8 1958.

Descriptors: (*Shafts, Turbine wheels), (*Turbine wheels, Shafts), (*Dynamics, Turbines), (*Turbines, Dynamics), Force(Mechanics), Stresses, Rotation, Oscillation, Frequency, Moments, Velocity, Mathematical analysis, Mechanical engineering, USSR.

AD-617 664 Div. 27/3
CFSTI Prices: HC$4.00 MF$0.75

Foreign Technology Div., Wright-Patterson AFB, Ohio.
SOLID PROPELLANT ROCKET ENGINES,
by V. V. Pozhkov. 23 Apr 65, 102p
Rept. no. FTD-MT-64-185
TT 65-62579

Unclassified report

Edited machine trans. of mono. Raketnye Dvigateli Tverdogo Topliva, Moscow, 1963 96p.
Available copy will not permit fully legible reproduction.

Descriptors: (*Rocket motors (Solid propellant), Handbooks), Solid rocket fuels, Physical properties, Combustion, Burning rate, Pressure, Rocket motor nozzles, Tocket propellent grains, Rocket igniters, Cooling, Maintenance, Thrust, USSR.

The pamphlet is devoted to description of working principle of solid propellent rocket engines and prospects of their development. Actual material of pamphlet is given according to data published in Soviet and foreign open press. Pamphlet is designed for soldiers and sergeants, students of military schools, and also for wide circle of civilian young people interested in rocket technology.

AD-617 678 Div. 27/2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
DIMENSIONLESS CHARACTERISTICS OF GAS TURBINE UNITS WITH SLITTED SHAFTS,
by V. A. Rogova and Tu Reng-yung. 2 Jul 65,
14p Rept. no. FTD-TT-65-671
TT 65-62592

Unclassified report

Unedited rough draft trans. of Energomashinostroenie (USSR) v9 n8 p14-7 1963.

Descriptors: (*Gas turbines, Design), Turbine parts, Tests, USSR.

The results are presented of designing a gas turbine unit with a slitted shaft at a variable regime and in relative units. (Author)

AD-617 679 Div. 27/4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
EXPERIMENTAL STUDY OF A MODEL CONTROL BLEEDER STAGE WITH A ROTATING DIAPHRAGM,
by M. E. Deich and A. G. Sheinkman. 2 Jul 65,
15p Rept. no. FTD-TT-65-669
TT 65-62593

Unclassified report

Unedited rough draft trans. of Energomashinostroenie (USSR) v11 n2 p14-7 1965.

Descriptors: (*Steam turbines, Experimental data), (*Diaphragms (Mechanics), Steam turbines), (*Bleed systems, Diaphragms (Mechanics)), Model tests, USSR.

The results of study of a model control bleeder stage with rotating diaphragm are presented, the efficiency of the stage is compared to a stage with a throttle valve, and also formulas are given for the determination of response. (Author)

AD-617 720 Div. 27/1, 11/2, 18/3, 26/4
CFSTI Prices: HC$2.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa.
Research and Development Directorate.
AUTOMATIC CHECKOUT SYSTEM FOR COMBAT VEHICLES, PHASE II REPORT, FORTY ENGINE TEST AND VERIFICATION TASK.
Test rept.,
by W. J. Lee and T. J. O'Kelly. Feb 65, 49p
Rept. no. T64-4-5

Unclassified report

Descriptors: (*Internal combustion engines, Test methods), Automatic, Vehicles, Maintenance, Standards, Quality control, Costs, Inventory control, Programming-(Computers).

The report presents, in graphic detail, the results obtained during Phase II of the Test Verification Task of the Automatic Checkout System for Combat Vehicles Project, which includes the computer-controlled automatic diagnostic tests of 40 (code no. 6, AV 1790 - 7 series) combat engines that were conducted at Letterkenny Army Depot. The results, to date, indicate that the Automatic Checkout System for Combat Vehicles constitutes a major breakthrough in automotive testing. It can substantially reduce the cost of maintaining automotive equipment while increasing the overall quality control of the rebuilt or repaired item. In addition, it is shown that drastic revisions can be made in stocking allocation since parts consumption is based on realistic, accurate data. Thus another significant savings can be realized and a more responsive inventory system obtained. (Author)

22. Space Technology

AD-617 327 Div. 12/6, 12/1, 15/1
CFSTI Prices: HC$5.00 MF$1.00

RAND Corp., Santa Monica, Calif.
THE OPTIMIZATION OF INTERPLANETARY ORBIT TRANSFERS BY DYNAMIC PROGRAMMING,
by F. T. Smith. Jul 65, 177p
Memo. no. RM-4622-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Optimization, Orbital trajectories), (*Transfer trajectories, Optimization), (*Interplanetary trajectories, Optimization), Dynamic programming, Iterative methods, Celestial mechanics, Thrust, Circular orbit trajectories.

This memorandum contains an investigation of the convergence of a computational method for optimizing interplanetary orbit transfers influenced by gravitational perturbations. The investigation is divided into three parts. First the necessary computational equations are derived. Next, the convergence of the computational process is investigated analytically. Finally, the results of a numerical investigation are presented. The numerical investigation involves the application of the computational method to the optimization of a low-thrust orbit transfer from Earth to Mars. The transfer is influenced by gravitational perturbations from Earth, Mars, and Jupiter. The objective of the orbit transfer is to place a space vehicle in a circular satellite orbit of Mars. It is concluded from the investigation that the process converges as indicated by the analysis when the numerical integration involved is sufficiently accurate. Further, any type of perturbing force can be accounted for when a computational formula is available. Finally, it is concluded that the method is flexible enough to be adapted to a number of practical situations. (Author)

AD-617 423 Div. 12/6, 12/1, 28/3, 30/3
CFSTI Prices: HC$3.00 MF$0.75

Martin Co., Baltimore, Md.
DESIGN, FABRICATION, AND INSTALLATION OF SIX-DEGREE-OF-FREEDOM SPACE MAINTENANCE SIMULATOR.
Final rept. for 26 Jan-28 Jul 64,
by A. E. Holmes. Apr 65, 95p
Contract AF33 615 1250, Proj. 8170, Task 817008
APL TR-64-129

Unclassified report

Descriptors: (*Simulators, Space environmental conditions), (*Space maintenance, Performance (Human)), Maintenance personnel, Maneuverability, Anthropometry, Positioning reactions, Gravity, Force(Mechanics), Motion, Supports, Design.

A 6-degree-of-freedom space maintenance simulator was designed, fabricated and installed. The simulator supports a 180 lb subject and 110 lb back pack with unlimited freedom in pitch, roll, and yaw; horizontal translation on frictionless air pads over a 20 x 30 ft floor; and vertical translation on air bearings ± 18 in. from a nominal position. Also, included was a servo controlled work panel capable of horizontal translation simulating a 3K to 7K lb object in orbit. The work panel is suspended from a 20 ft span bridge crane with both axes controlled by servo amplifiers housed in a single rack. A 140 SCF air tank provides a low rate air spring for vertical translation. (Author)

AD-617 589 Div. 12/6, 12/2, 2/7, 8/6

Stanford Univ., Calif.
AN ION GYROFREQUENCY PHENOMENON OBSERVED IN SATELLITES,
by R. L. Smith, N. M. Brice, J. Katsufrakis, D. A. Gurnett, and S. D. Shawhan. 1964, 5p
Grant NsG174 61

Unclassified report

Pub. in Nature v204 n4955 p274-5 Oct 17 1964
(Copies available only to DDC users).
Prepared in cooperation with Iowa State Univ., Iowa City, Contract N9onr93803, Grant NsG233 62, and Defence Research Telecommunications Establishment, Ottawa (Canada).

Descriptors: (*Satellites(Artificial), Radiofrequency interference), (*Atmospherics, Satellites(Artificial)), Very low frequency, Ionospheric propagation, Ions, Atmospheric sounding.

AD-617 666 Div. 12/6, 12/17, 2/1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
RESULTS OF THE NUMERICAL INTEGRATION OF THE EQUATIONS OF THE MOTION OF AN ARTIFICIAL EARTH SATELLITE,
by A. V. Egorova. 19 May 65, 13p
Rept. no. FTD-TT-65-57
TT 65-62581

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR, Institut Teoreticheskoi Astronomii. Byulleten v9 n5(108) p323-9 1963.

Descriptors: (*Satellites(Artificial), Motion), (*Integration, Differential equations), Orbital trajectories, Numerical analysis, Celestial mechanics, N-body problem, USSR.

AD-617 698 Div. 12/6, 12/1, 30/5
CFSTI Prices: HC$2.00 MF$0.50

Autometric Facility, Raytheon Co., Alexandria, Va.
PROGRAM AND TEST PROCEDURES TO DETERMINE THE GEOCENTRIC COORDINATES AND ORBITAL PARAMETERS OF AN UNIDENTIFIED SATELLITE.
Final rept.
5 May 65, 34p Rept. no. FR-65-141
Contract DA44 009AMC781X

Unclassified report

Descriptors: (*Orbital trajectories, Satellites-(Artificial)), (*Programming(Computers), Orbital trajectories), Partial differential equations, Matrix algebra, Test methods.

The methods outlined by Everett L. Merritt for solving for geocentric position and orbital parameters from a single camera station are tested. It was further proposed that one might solve for the ground station if the orbit is known or solve for the orbit knowing the ground station. The possibility of including a and e of the earth was also mentioned.

AD-617 885 Div. 12/6, 12/1
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
THE INDUSTRY-GOVERNMENT AEROSPACE

RELATIONSHIP. VOLUME I. REPORT.
May 63, 57p
Proj. IS4216

Unclassified report

Descriptors: (*Astronautics, Research program administration), (*United States Government, Industries), (*Industrial research, Astronautics), (*Research program administration, Astronautics), Industrial relations, Scientific research, Spacecraft, Management engineering, Costs, Budgets, Economics.

It is the practice of the U. S. government to depend primarily upon private industry for the conception, the research and development, and the production of defense and space systems. The achievements of industry have helped to preserve the security and the international technical reputation of the country. However, many representatives of both industry and government believe that the industry-government relationship is not as creative, productive, or satisfactory as it should be, either to the nation as a whole or to the parties directly involved. To provide bases for improving the effectiveness of this combined effort, a study was made of the industry-government aerospace relationship, which includes companies, large and small, that are contributing to the aerospace effort, together with the many government agencies concerned. The unique and especially fruitful aspects of the Relationship, as well as its weaknesses, were examined in this study. Major problems confronting both government and industry in this close association were noted, and suggestions for resolving them were made.

AD-617 886 Div. 12/6, 12/1
CFSTI Prices: HC$6.00 MF$1.75

Stanford Research Inst., Menlo Park, Calif.
THE INDUSTRY-GOVERNMENT AEROSPACE RELATIONSHIP. VOLUME II. SUPPORTING RESEARCH.
May 63, 314p
Proj. IS4216

Unclassified report

See also AD-617 885.

Descriptors: (*Astronautics, Research program administration), (*United States Government, Industries), (*Industrial research, Astronautics), (*Research program administration, Astronautics), Launch vehicles(Aerospace), Industrial relations, Scientific research, Spacecraft, Management engineering, Aerospace craft, Budgets, Government procurement, Economics, Costs.

The survey was undertaken to provide a factual basis for improving the Relationship through an improved understanding of the Relationship's unique character and the problems of the government and the aerospace industry. In the survey, the project team has considered the reasons for the existence of the Relationship and external constraints placed upon it; the parties involved, their internal working relationships, and their impact on each other; and the Relationship's accomplishments. The detailed analyses, methodology, supporting data, and research results are presented.

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field number. A typical subject index entry is shown below.

*COMBUSTION
OSCILLATION
INTENTIONAL COMBUSTION
OSCILLATIONS IN PROPULSION
SYSTEMS
AD-608 206 FLD. 25

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field numbers and titles are also listed. Again, three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*BENDAT, JULIUS S.
* * *
ZERO CROSSINGS OF A SINE
WAVE PLUS RANDOM NOISE
AD-608 019 FLD. 15
* * *
SPECTRA AND AUTOCORRELATION
FUNCTIONS FOR FULLY DEVELOPED
SEAS AND PREDICTION OF STRUCTURAL
FATIGUE DAMAGE
AD-608 464 FLD. 2

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry (designated by an asterisk) for each document are listed the originator of the report, the originator's report number, the title, AD number, and field number. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parantheses directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

*SHEFFIELD UNIV (ENGLAND)
* * *
HIC 45
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS.
(AFOSR 64 2029)
AD-608 206 FLD. 25

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
* * *
64 2029
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS.
AD-608 206 FLD. 25

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and division number.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 500
LINCOLN LAB MASS INST OF TECH LEXINGTON
LL TR 365
(ESD TDR64 378)
AD-608 272 FLD. 30
LL 1964 63
(ESD TDR64 566)
AD-608 288 FLD. 8

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the subject division where the full entry can be located in TAB.

SUBJECT INDEX

The fields indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

•ABLATION
MELTING
BOUNDS IN MELTING PROBLEMS WITH ARBITRARY RATES OF LIQUID REMOVAL.
AD-617 329 FLD. 20

•ACCELERATION TOLERANCE
RATS
CHANGES IN SPONTANEOUS ACTIVITY AS A MEASURE OF SENSITIVITY TO ROTATION IN THE WHITE RAT.
AD-617 752 FLD. 6

•ACIDS
CHROMATOGRAPHIC ANALYSIS
REPRINT: NEW METHOD FOR THE DETECTION OF SOME AROMATIC ACIDS.
AD-617 647 FLD. 7

•ACOUSTIC EQUIPMENT
SEMICONDUCTOR DEVICES
ACTIVE ACOUSTIC DEVICES.
AD-617 749 FLD. 9

•ACOUSTIC SIGNALS
LANDING AIDS
AURAL RECEPTION OF INSTRUMENT LANDING SYSTEM SIGNALS.
AD-617 914 FLD. 17

•ACOUSTICS
LIQUIDS
REPRINT: PROPAGATION OF ACOUSTIC TRANSIENTS IN ABSORBING AND RELAXING LIQUIDS.
AD-617 910 FLD. 20

MAGNETOHYDRODYNAMICS
LOW DENSITY UNIVERSAL INSTABILITY IN A NON-UNIFORM PLASMA.
AD-617 883 FLD. 20

SOLAR ATMOSPHERE
STRUCTURE OF THE SOLAR CHROMOSPHERE.
AD-617 852 FLD. 3

SONAR EQUIPMENT
ACOUSTIC INTERACTION FOR LINEAR ARRAYS OF SMALL MAGNETOSTRICTIVE-STACK SONAR TRANSDUCERS AT AN AIR-WATER SURFACE.
AD-617 349 FLD. 17

UNDERWATER COMMUNICATION SYSTEMS
TRANSINFORMATION OF A BINARY UNDERWATER ACOUSTIC COMMUNICATION CHANNEL REFLECTED FROM A RANDOM SURFACE.
AD-617 776 FLD. 9

•ACRYLIC RESINS
DYNAMICS
REPRINT: DYNAMIC MECHANICAL PROPERTIES OF POLY(N-BUTYL METHACRYLATE) NEAR ITS GLASS TRANSITION TEMPERATURE.
AD-617 989 FLD. 11

OXIDATION
REPRINT: MECHANISM OF AUTOXIDATION OF THREE VINYL POLYMERS: POLYPROPYLENE, ETHYLENE-PROPYLENE RUBBER, AND POLY(ETHYL ACRYLATE).
AD-617 999 FLD. 7

•ADAPTIVE CONTROL SYSTEMS
COMPUTER LOGIC
ADAPTIVE THRESHOLD LOGIC.
AD-617 912 FLD. 9

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•AF19 628 2454
ATMOSPHERIC RESEARCH AND DEVELOPMENT CORP KANSAS CITY MO
(AFCRL 65-331)
AD-617 726 FLD. 4

•AF19 628 2489
MCGILL UNIV MONTREAL (QUEBEC) STORMY WEATHER GROUP
MW 40
(AFCRL 65-339 V1)
AD-617 600 FLD. 4
MW 40
(AFCRL 65-339 V2)
AD-617 688 FLD. 4

•AF19 628 2498
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
(AFCRL 65-334)
AD-617 619 FLD. 20

•AF19 628 265
HAWAII INST OF GEOPHYSICS HONOLULU
(AFCRL 69-307)
F AD-617 519 FLD. 4

•AF19 628 297
CHU ASSOCIATES LITTLETON MASS
(AFCRL 69-171)
F AD-617 710 FLD. 9

•AF19 628 324 GRANT
CALIFORNIA UNIV BERKELEY
(AFOSR 69-0909)
AD-617 238 FLD. 9

•AF19 628 3312
NORTHEASTERN UNIV BOSTON MASS
(AFCRL 69-20)
AD-617 403 FLD. 20

•AF19 628 356
MASSACHUSETTS INST OF TECH CAMBRIDGE
AD-617 792 FLD. 20

•AF19 628 369
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
(AFCRL 69-305)
F AD-617 784 FLD. 18

•AF19 628 379
NEW YORK UNIV N Y SCHOOL OF ENGINEERING AND SCIENCE
(AFCRL 69-312)
AD-617 888 FLD. 9

•AF19 628 3819
ILLINOIS UNIV URBANA ENGINEERING EXPERIMENT STATION
(AFCRL 65-222)
AD-617 251 FLD. 9

•AF19 628 4081
UNIVAC BLUE BELL PA
(AFCRL 65-299)
AD-617 516 FLD. 9

•AF19 628 4299
KAMAN NUCLEAR COLORADO SPRINGS COLO
(AFCRL 65-369)
F AD-617 352 FLD. 12

•AF19 628 5035
AUERBACH CORP PHILADELPHIA PA
(ESD TR-65-276)
AD-617 613 FLD. 9

•AF19 628 5092
STANFORD RESEARCH INST MENLO PARK CALIF
(AFCRL 69-400)
AD-617 786 FLD. 12

•AF23 601 3455
GEOPHYSICAL AND POLAR RESEARCH CENTER UNIV OF WISCONSIN MADISON
F AD-617 356 FLD. 8

•AF29 601 5007
ILLINOIS UNIV URBANA DEPT OF CIVIL ENGINEERING
(NL TR-69-71)
F AD-617 409 FLD. 13

•AF30 602 2166
ANTENNA LAB OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
(RADC TR-69-67 V1)
AD-617 536 FLD. 17
(RADC TR-69-67 V3)
AD-617 537 FLD. 17
(RADC TR-69-69)
AD-617 750 FLD. 17
(RADC TR-69-108)
F AD-617 751 FLD. 17

•AF30 602 2468
POLYTECHNIC INST OF BROOKLYN N Y
(RADC TR-69-128)
AD-617 260 FLD. 9

•AF30 602 2936
COLORADO UNIV BOULDER
(RADC TR-69-114)
AD-617 781 FLD. 20

•AF30 602 2992
RESEARCH LABS DIV BENDIX CORP SOUTHFIELD MICH
(RADC TDR-64-405)
AD-617 762 FLD. 8

•AF30 602 2994
MOORE SCHOOL OF ELECTRICAL ENGINEERING UNIV OF PENNSYLVANIA PHILADELPHIA
(RADC TR-69-311)
F AD-617 616 FLD. 9

•AF30 602 3390
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
F AD-617 409 FLD. 9
(RADC TR-65-113 V2)
F AD-617 410 FLD. 9

•AF30 602 3395
GENERAL ELECTRIC CO SCHENECTADY N Y POWER TUBE DEPT
(RADC TR-69-100)
F AD-617 779 FLD. 9

•AF30 602 3474
HUGHES AIRCRAFT CO FULLERTON CALIF
(RADC TR-69-45)
F AD-617 693 FLD. 9

•AF30 602 3478
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
(RADC TR-69-89)
AD-617 749 FLD. 9

•AF30 602 3493
SPACE AND INFORMATION SYSTEMS DIV NORTH AMERICAN AVIATION INC DOWNEY CALIF
(RADC TR-69-33)
F AD-617 615 FLD. 5

•AF30 602 3499
LITTON SYSTEMS INC CANOGA PARK CALIF DATA SYSTEM'S DIV
(RADC TR-69-47)
F AD-617 780 FLD. 14

•AF30 602 3508
RAYTHEON CO WALTHAM MASS MICROWAVE AND POWER TUBE DIV
(RADC TR-69-75)
F AD-617 694 FLD. 9

•AF33 601 7261
C-E-I-R LTD LONDON (ENGLAND)
(ARL 69-62)
F AD-617 703 FLD. 20

*AF33 608 1039
ARIZONA STATE UNIV TEMPE
SCHOOL OF ENGINEERING
AD-617 408 FLD. 13

*AF33 608 1070
INDIANA UNIV BLOOMINGTON
AD-617 409 FLD. 6

*AF33 608 1072
IOWA STATE UNIV IOWA CITY
AD-617 416 FLD. 5

*AF33 608 1093
NORTH DAKOTA UNIV GRAND FORKS
AD-617 414 FLD. 17

*AF33 608 1104
PITTSBURGH UNIV PA
AD-617 896 FLD. 5

*AF33 608 1121
TEXAS UNIV AUSTIN
AD-617 411 FLD. 13
AD-617 412 FLD. 9

*AF33 608 1129
WASHINGTON UNIV SEATTLE
AD-617 417 FLD. 9

*AF33 615 1078
ELECTRONICS RESEARCH LAB UNIV
OF CALIFORNIA BERKELEY
(AFOSR 69-0911)
AD-617 234 FLD. 20

*AF33 615 1079
GAS DYNAMICS LAB PRINCETON
UNIV N J
(ARL 69-90)
AD-617 891 FLD. 20

*AF33 615 1124
RADIATION EFFECTS INFORMATION
CENTER COLUMBUS OHIO
AD-617 722 FLD. 18

*AF33 615 1141
ELECTRONICS RESEARCH LABS
COLUMBIA UNIV NEW YORK
(ARL 69-99)
AD-617 702 FLD. 14

*AF33 615 1250
MARTIN CO BALTIMORE MD
(APL TR-69-129)
F AD-617 423 FLD. 22

*AF33 615 1339
C-E-I-R LTD LONDON (ENGLAND)
(ARL 69-91)
F AD-617 705 FLD. 20

*AF33 615 1418
MEASUREMENT ANALYSIS CORP
LOS ANGELES CALIF
(FDL TR-69-198)
F AD-617 419 FLD. 12
(FDL TDR-69-116)
F AD-617 611 FLD. 12

*AF33 615 2228
BATTELLE MEMORIAL INST COLUMBUS
OHIO
AD-617 252 FLD. 7

*AF33 615 2289
GARRETT CORP PHOENIX ARIZ
AIRESEARCH MFG DIV
(APL TR-69-91)
AD-617 712 FLD. 11

*AF33 615 2532
TRANSDUCER INFORMATION CENTER
BATTELLE MEMORIAL INST
COLUMBUS OHIO
AD-617 396 FLD. 14

*AF33 616 6960
DOUGLAS AIRCRAFT CO INC LONG
BEACH CALIF
(FDL TDR-69-70)
AD-617 354 FLD. 1

*AF33 616 6983
UNITED STATES INDUSTRIES INC
SILVER SPRING MD EDUCATIONAL
SCIENCE DIV
(AMRL TR-69-93)
F AD-617 740 FLD. 5

*AF33 616 7661
POLYTECHNIC INST OF BROOKLYN
N Y
(ARL 69-87)
AD-617 622 FLD. 1

*AF33 616 7681
BELL AEROSYSTEMS CO BUFFALO
N Y
(AMRL TR-69-18)
F AD-617 998 FLD. 5

*AF33 616 7838
DAYTON UNIV OHIO RESEARCH
INST
AD-617 889 FLD. 14

*AF33 616 8483
CINCINNATI UNIV OHIO
(ARL 69-93)
AD-617 620 FLD. 21

*AF33 681 1029 GRANT
TEXAS UNIV AUSTIN DEPT OF
MATHEMATICS
(AFOSR 68-1018)
AD-617 799 FLD. 12

*AF33 687 10869
RADIO CORP OF AMERICA CAMDEN
N J
(FDL TDR-64-150)
F AD-617 920 FLD. 14

*AF33 687 11080
CURTISS DIV CURTISS-WRIGHT
CORP CALDWELL N J
(AFFDL TR-64-181)
F AD-617 967 FLD. 1

*AF33 687 11339
GRAFLEX INC ROCHESTER N Y
(AMRL TR-69-78)
F AD-617 607 FLD. 5
(AMRL TR-69-79)
F AD-617 608 FLD. 5
(AMRL TR-69-80)
F AD-617 609 FLD. 5

*AF33 687 11697
HUYCK RESEARCH CENTER STAMFORD
CONN
(ARL 69-86)
F AD-617 621 FLD. 21

*AF33 687 11786
HINE LABS INC SAN FRANCISCO
CALIF
(AMRL TR-69-99)
F AD-617 691 FLD. 6
(AMRL TR-69-98)
F AD-617 692 FLD. 6

*AF33 687 12174
PRINCETON UNIV N J DEPT
OF AEROSPACE AND MECHANICAL
SCIENCES
AD-617 761 FLD. 14

*AF33 687 7614
ELECTRONICS RESEARCH LAB UNIV
OF CALIFORNIA BERKELEY
(AFOSR 68-0911)
AD-617 234 FLD. 20

*AF33 687 8286
POLYTECHNIC INST OF BROOKLYN
N Y DEPT OF AEROSPACE ENGINEERING
AND APPLIED MECHANICS
(ARL 69-158)
AD-617 879 FLD. 20

*AF33 687 9919
CARNEGIE INST OF TECH PITTSBURGH
PA
(APL TR-69-133 P2)
F AD-617 728 FLD. 10

*AF33619-1916
NEW YORK UNIV N Y
(ARL 69-89)
AD-617 701 FLD. 1

*AF90 638 1321
MICROWAVE LAB STANFORD UNIV
CALIF
(AFOSR 69-1077)
AD-617 882 FLD. 9

*AF91 609 2269
SERVICE BUREAU CORP SAN ANTONIO
TEX
(PRL TR-69-8)
AD-617 335 FLD. 5

*AF99 638 1048
ILLINOIS UNIV URBANA DEPT
OF PHYSICS
(AFOSR 69-0772)
AD-617 372 FLD. 20

*AF99 638 1060
STANFORD ELECTRONICS LABS
STANFORD UNIV CALIF
(AFOSR 69-0899)
AD-617 880 FLD. 9

*AF99 638 1068 GRANT
STANFORD ELECTRONICS LABS
STANFORD UNIV CALIF
(AFOSR 69-0897)
AD-617 851 FLD. 9

*AF99 638 1115
TEXAS UNIV AUSTIN
AD-617 442 FLD. 8

*AF99 638 1169
ATLANTIC RESEARCH CORP ALEXANDRIA
VA
AD-617 272 FLD. 21

*AF99 638 1207
GRUMMAN AIRCRAFT ENGINEERING
CORP BETHPAGE N Y
AD-617 270 FLD. 12

*AF99 638 1220
RIAS INC BALTIMORE MD
(AFOSR 69-1097)
F AD-617 899 FLD. 7

*AF99 638 1249
PRINCETON UNIV N J
AD-617 746 FLD. 8

*AF99 638 1330
MICROWAVE ELECTRONICS CORP
PALO ALTO CALIF
(AFOSR 69-0898)
AD-617 492 FLD. 20

*AF99 638 1369
POLYTECHNIC INST OF BROOKLYN
N Y DEPT OF PHYSICS
(AFOSR 69-0774)
AD-617 828 FLD. 20

*AF99 638 1391
POLYTECHNIC INST OF BROOKLYN
N Y
(ARL 69-87)
AD-617 622 FLD. 1

*AF99 638 1398
ELECTRONICS RESEARCH LABS
COLUMBIA UNIV NEW YORK
(ARL 69-99)
AD-617 702 FLD. 14

*AF99 638 209
ENRICO FERMI INST FOR NUCLEAR
STUDIES UNIV OF CHICAGO
ILL
(AFOSR 68-0836)

AD-617 872 FLD. 20

•AF49 638 700
RAND CORP SANTA MONICA CALIF
AD-617 318 FLD. 12
AD-617 327 FLD. 22
AD-617 339 FLD. 19
AD-617 549 FLD. 19
AD-617 606 FLD. 12
AD-617 909 FLD. 12

•AF49 638 914
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
(AFOSR 64-1429)
F AD-617 562 FLD. 20

•AF61 052 23
MILAN UNIV (ITALY)
(AFOSR TN-59-1008)
AD-617 794 FLD. 6
(AFOSR TN-59-1009)
AD-617 795 FLD. 6

•AF61 052 293
SIENA UNIV (ITALY)
(AFOSR 65-0994)
AD-617 633 FLD. 5

•AF61 052 388
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
(AFCRL 65-108)
AD-617 247 FLD. 20

•AF61 052 439
UNIVERSITY COLL DUBLIN (IRELAND)
UNIT CELL METABOLISM
(AFOSR 65-0871)
F AD-617 700 FLD. 6

•AF61 052 679
INNSBRUCK UNIV (AUSTRIA)
(AFOSR 65-0933)
AD-617 553 FLD. 20
(AFOSR 65-1313)
AD-617 898 FLD. 20

•AF61 052 680
NORWEGIAN INST OF COSMIC PHYSICS
UNIV OF OSLO
(AFCRL 65-483)
AD-617 869 FLD. 4

•AF61 052 743
OSLO UNIV (NORWAY) INST OF THEORETICAL ASTROPHYSICS
(AFCRL 65-366)
AD-617 566 FLD. 3

•AF61 052 762
ROYAL INST OF TECH STOCKHOLM (SWEDEN) DEPT OF PHYSICS
(AFCRL 65-423)
AD-617 347 FLD. 7

•AF61 052 807
ROME UNIV (ITALY) ISTITUTO DI ELETTRONICA
(AFCRL 65-390)
AD-617 742 FLD. 20

•AF61 052 98
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
(AFOSR 65-0762)
AD-617 632 FLD. 20

•AT04 3 63
CALIFORNIA INST OF TECH PASADENA
AD-617 437 FLD. 20

•AT11 1 1198
ILLINOIS UNIV URBANA
AD-617 227 FLD. 20

•AT11 1 1291
WASHINGTON UNIV ST LOUIS MO DEPT OF PHYSICS
(AROD 2802:13)
AD-617 488 FLD. 20

•AT40 1 2784
ARMED FORCES INST OF PATHOLOGY ARMY MEDICAL CENTER WASHINGTON D C
AD-617 841 FLD. 2

•AT40 1 3293 GRANT
MIAMI UNIV CORAL GABLES FLA
DEPT OF PHYSICS
AD-617 783 FLD. 20

•AT49 9 2110
NAVAL RESEARCH LAB WASHINGTON D C
AD-617 319 FLD. 18

•CBB10709
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
TR 3
(SRDS RD-65-61)
AD-617 774 FLD. 1

•CBB10870
BOWAN (WALTER A) CO PARK RIDGE ILL
F AD-617 571 FLD. 4

•DA ARO D31 124 6388
TEXAS UNIV AUSTIN
(AROD 3772:11)
AD-617 638 FLD. 12

•DA ARO D31 1246271
CALIFORNIA UNIV LOS ANGELES
DEPT OF CHEMISTRY
(AROD 3580:19)
AD-617 499 FLD. 7

•DA ARO D31 1246487
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
(AROD 4284:3)
F AD-617 258 FLD. 20

•DA ARO D31 1246576
CALIFORNIA UNIV BERKELEY
DEPT OF ELECTRICAL ENGINEERING
(AROD 5177:2)
AD-617 575 FLD. 9

•DA ARO D31 124678
CARNEGIE INST OF TECH PITTSBURGH PA
(AROD 223:62)
AD-617 858 FLD. 12
(AROD 223:63)
AD-617 859 FLD. 9

•DA AROD31 1246130
PRINCETON UNIV N J
(AROD 1715:67)
AD-617 481 FLD. 12

•DA AROD31 1246312
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
(AROD 1688:23)
AD-617 800 FLD. 9

•DA AROD31 1246340
ILLINOIS UNIV URBANA DEPT OF PHYSICS
(AROD 431:63)
AD-617 433 FLD. 20

•DA AROD31 1246380
COLUMBIA RADIATION LAB NEW YORK
(AROD 3922:14)
AD-617 493 FLD. 20

•DA AROD31 1246388
TEXAS UNIV AUSTIN
(AROD 3772:10)
AD-617 492 FLD. 12
TEXAS UNIV AUSTIN COMPUTATION CENTER
(AROD 3772:13)
AD-617 353 FLD. 12
(AROD 3772:12)
AD-617 597 FLD. 12

•DA AROD31 1246499
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AROD 2832:20)
AD-617 996 FLD. 7

•DA AROD31 1246499
CALIFORNIA UNIV LOS ANGELES
(AROD 1517:74)
AD-617 492 FLD. 12

•DA AROD31 1246609
ILLINOIS UNIV URBANA
(AROD 3103:2)
AD-617 627 FLD. 20

•DA AROD31 1246630
NORTH CAROLINA STATE UNIV RALEIGH SCHOOL OF PHYSICAL SCIENCES AND APPLIED MATHEMATICS
(AROD 4105:5)
AD-617 479 FLD. 12

•DA AROD31 1246707
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AROD 2246:12)
AD-617 477 FLD. 12

•DA AROD31 124678
CARNEGIE INST OF TECH PITTSBURGH PA
(AROD 223:61)
AD-617 857 FLD. 12

•DA MD49 193 646133
VIRGINIA UNIV CHARLOTTESVILLE BIOCHEMICAL LAB
AD-617 518 FLD. 6

•DA MD49 193 696143
DENVER GENERAL HOSPITAL COLO
AD-617 629 FLD. 6

•DA ORD31 124 61642
PRINCETON UNIV N J
(AROD 1073:40)
AD-617 446 FLD. 7

•DA 28 043AMC00129E
NEW YORK UNIV N Y RADIATION AND SOLID STATE LAB
AD-617 782 FLD. 11

•DA04 495AMC116X
GENERAL ATOMIC DIV GENERAL DYNAMICS CORP SAN DIEGO CALIF
A AD-617 940 FLD. 20

•DA11 022ORD2917
GENERAL TECHNOLOGY CORP ELGIN ILL
AD-617 402 FLD. 19

•DA18 020ENG30096
CONESCO INC CAMBRIDGE MASS
(PSDC TR-19)
F AD-617 924 FLD. 18

•DA19 020ORD9233
REMINGTON ARMS CO INC BRIDGEPORT CONN
F AD-617 389 FLD. 19

•DA19 129AMC190X
UTAH RESEARCH AND DEVELOPMENT CO SALT LAKE CITY
AD-617 892 FLD. 19

•DA22 079ENG322
MARSHALL UNIV HUNTINGTON W VA.
AD-617 728 FLD. 2
AD-617 727 FLD. 2

•DA28 017AMC923A
AMMANN AND WHITNEY NEW YORK
(PA TM-C-1)
AD-617 614 FLD. 13

•DA28 043AMC00042E
PIONEER CENTRAL DIV BENDIX CORP DAVENPORT IOWA
AD-617 787 FLD. 9

•DA28 043AMC00069E
EAGLE-PICHER CO JOPLIN MO
F AD-617 406 FLD. 10

•DA28 043AMC00082E
STANFORD RESEARCH INST MENLO PARK CALIF
AD-617 361 FLD. 20

•DA28 043AMC00265E
RADIO CORP OF AMERICA HARRISON N J ELECTRONIC COMPONENTS AND DEVICES
AD-617 603 FLD. 10

•DA28 043AMC00278E
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
AD-617 939 FLD. 9

•DA28 043AMC00280E
AIRTRON INC MORRIS PLAINS N J
AD-617 968 FLD. 9

•DA28 043AMC00326E
HUGHES AIRCRAFT CO CULVER CITY CALIF
AD-617 343 FLD. 20

•DA28 043AMC00436E
SILICONIX INC SUNNYVALE CALIF
AD-617 424 FLD. 9

•DA28 043AMC01222E
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
F AD-617 351 FLD. 10

•DA31 129ARO D172
VERMONT UNIV BURLINGTON DEPT OF PHYSICS
(AROD 4403:3C)
AD-617 826 FLD. 20

•DA31 129ARO D288
ILLINOIS UNIV URBANA DEPT OF MATHEMATICS
(AROD 5254:3)
AD-617 739 FLD. 12

•DA31 129ARO D96
POLYTECHNIC INST OF BROOKLYN N Y
(AROD 2428:6)
AD-617 445 FLD. 12

•DA31 129AROD199
PRINCETON UNIV N J
(AROD 5038:2)
F AD-617 925 FLD. 5

•DA31 129AROD209
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
(AROD 247:65)
AD-617 439 FLD. 20

•DA31 129AROD213
TRW SPACE TECHNOLOGY LABS REDONDO BEACH CALIF
F AD-617 927 FLD. 20

•DA31 129AROD63
RIAS INC BALTIMORE MD
AD-617 778 FLD. 11

•DA33 008ORD1787
CINCINNATI UNIV OHIO
F AD-617 274 FLD. 7

•DA33 008ORD1971
CINCINNATI UNIV OHIO
F AD-617 279 FLD. 7

•DA36 039AMC00027E
ELECTRON PHYSICS LAB UNIV OF MICHIGAN ANN ARBOR
AD-617 738 FLD. 9

•DA36 039AMC01477E
SPERRY MICROWAVE ELECTRONICS CO CLEARWATER FLA
AD-617 729 FLD. 9

•DA36 039AMC01483E
CRYSTALONICS INC CAMBRIDGE MASS
F AD-617 401 FLD. 9

•DA36 039AMC02164E
ELECTRONICS RESEARCH LAB UNIV OF CALIFORNIA BERKELEY
AD-617 329 FLD. 9

•DA36 039AMC02221E
WATKINS-JOHNSON CO PALO ALTO CALIF
AD-617 910 FLD. 9

•DA36 039AMC03200 GRANT
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-617 591 FLD. 6

•DA36 039AMC03200E
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-617 649 FLD. 20

•DA36 039AMC03201E
ROCKETDYNE CANOGA PARK CALIF
AD-617 719 FLD. 10

•DA36 039AMC03270E
MICTRON INC ALBANY N Y
AD-617 396 FLD. 20

•DA36 039AMC03617E
WESTINGHOUSE ELECTRIC CORP PHILADELPHIA PA
AD-617 736 FLD. 9

•DA36 039AMC03632E
TEXAS INSTRUMENTS INC DALLAS
AD-617 564 FLD. 9

•DA36 039AMC04188E
FAIRCHILD SEMICONDUCTOR DIV FAIRCHILD CAMERA AND INSTRUMENT CORP MOUNTAIN VIEW CALIF
AD-617 893 FLD. 9

•DA36 039SC72729
WESTERN ELECTRIC CO LAURELDALE PA
F AD-617 949 FLD. 9

•DA36 039SC89202
TEXAS A AND M UNIV COLLEGE STATION DEPT OF OCEANOGRAPHY AND METEOROLOGY
AD-617 243 FLD. 4

•DA36 039SC90783
MARTIN CO ORLANDO FLA
AD-617 397 FLD. 20

•DA49 009AMC781X
AUTOMETRIC FACILITY RAYTHEON CO ALEXANDRIA VA
F AD-617 698 FLD. 22

•DA49 099AMC930T
HOLMAN (JOHN F) CO INC WASHINGTON D C
(AERDL T-1786-691)
AD-617 422 FLD. 19

•DA49 188AR02
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
AD-617 767 FLD. 5

•DA49 113MD2032
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF CHEMISTRY
AD-617 931 FLD. 7

•DA49 186AMC394X
UNIVAC DIV SPERRY RAND CORP ST PAUL MINN
F AD-617 699 FLD. 20

•DA49 193MD2032
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF CHEMISTRY
AD-617 871 FLD. 7

•DA49 193MD2074
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
AD-617 695 FLD. 6

•DA49 193MD2171 GRANT
PRESBYTERIAN-ST LUKE'S HOSPITAL CHICAGO ILL
AD-617 590 FLD. 6

•DA49 193MD2281
IIT RESEARCH INST CHICAGO ILL
AD-617 896 FLD. 6
AD-617 897 FLD. 6

•DA91 591EUC3607
SYSTEM RESEARCH LTD RICHMOND (ENGLAND)
AD-617 473 FLD. 12

•DRB1601 17
ALBERTA UNIV EDMONTON DEPT OF CHEMISTRY
AD-617 580 FLD. 7

•DRB2001 01
ALBERTA UNIV EDMONTON DEPT OF CHEMISTRY
AD-617 814 FLD. 7

•DRB2804 08
SASKATCHEWAN UNIV SASKATOON
AD-617 599 FLD. 19

•DRB9380 14C
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-617 983 FLD. 6

•DRB9380 14G
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-617 583 FLD. 6

•DRB9810 23
ROYAL MILITARY COLL OF CANADA KINGSTON (ONTARIO) DEPT OF PHYSICS
AD-617 582 FLD. 20

•DRB9810 30
ROYAL MILITARY COLL OF CANADA KINGSTON (ONTARIO)
AD-617 842 FLD. 20

•DRB9812 20
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OTHER RESEARCH REPORTS AND RELATED MATERIAL

REPORTS RELEASED BY AEC, NASA, DEPARTMENT OF COMMERCE, OTHER CIVILIAN AGENCIES, AND ALSO CERTAIN OLDER MILITARY REPORTS

*Descriptors marked with an asterisk are included in the subject index

01. Aeronautics

N65-17128 Field 1B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
THE IMPACT OF V/STOL AIRCRAFT ON INSTRUMENT WEATHER OPERATIONS,
by John P. Reeder. Feb 65, 15p
NASA-TN-D-2702
Unclassified report

Descriptors: (*Vertical take-off planes, All-weather aviation), (*All-weather aviation, Vertical take-off planes).

N65-17327 Field 1A, 22C
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
TRANSONIC AERODYNAMIC CHARACTERISTICS OF A SERIES OF BODIES HAVING VARIATIONS IN FINENESS RATIO AND CROSS-SECTIONAL ELLIPTICITY,
by Bernard Spencer, Jr., and W. Pelham Phillips.
Feb 65, 84p NASA-TN-D-2622
Unclassified report

Descriptors: (*Aerodynamic configurations, Aerodynamic characteristics), (*Reentry vehicles, Lift).

N65-17335 Field 1D
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
A SYSTEM FOR VARYING THE STABILITY AND CONTROL OF A DEFLECTED-JET FIXED-WING VTOL AIRCRAFT,
by Frank. A. Pauli, Daniel M. Hegarty, and Thomas M. Walsh. Mar 65, 27p NASA-TN-D-2700
Unclassified report

Descriptors: (*Vertical take-off planes, Hovering), (*Hovering, Flight control systems).

N65-17456 Field 1A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
LOW-SPEED FORCE AND FLIGHT INVESTIGATION OF A MODEL OF A MODIFIED PARAWING UTILITY VEHICLE,
by Joseph L. Johnson, Jr. Mar 65, 58p
NASA-TN-D-2492
Unclassified report

Descriptors: (*Parawings, Aerodynamic characteristics), (*Aeronautics, Parawings).

N65-17458 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SPIN-ENTRY CHARACTERISTICS OF A DELTA-WING AIRPLANE AS DETERMINED BY A DYNAMIC MODEL,
by James S. Bowman. Mar 65, 50p
NASA-TN-D-2656
Unclassified report

Descriptors: (*Delta wings, Aerodynamic characteristics).

N65-18211 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
FLIGHT INVESTIGATION OF THE VZ-2 TILT-WING AIRCRAFT WITH FULL-SPAN FLAP,
by Robert J. Pegg, Henry L. Kelley, and John P. Reeder. Mar 65, 41p NASA-TN-D-2680
Unclassified report

Descriptors: (*Tilt wings, Aerodynamic characteristics).

N65-18503 Field 1D
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
WIND-TUNNEL INVESTIGATION OF A TILT-WING VTOL AIRPLANE WITH ARTICULATED ROTORS,
by James A. Weiberg and Demo J. Giulianetti.
Mar 65, 55p NASA-TN-D-2538
Unclassified report

Descriptors: (*Rotary wings, Performance-(Engineering)), (*Sort take-off planes, Control systems).

N65-18606 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
TURBULENT SKIN FRICTION AT HIGH REYNOLDS NUMBERS AND LOW SUPERSONIC VELOCITIES,
by Mary W. Jackson, K. R. Czarnecki, and William J. Monta. Mar 65, 31p NASA-TN-D-2687
Unclassified report

Descriptors: (*Turbulent boundary layer, Friction), (*Supersonic characteristics, Drag).

N65-18617 Field 1D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EFFECTS OF LATERAL CONTROL CHARACTERISTICS ON HOVERING A JET LIFT VTOL AIRCRAFT,
by L. Stewart Rolls, Fred J. Drinkwater III, and Robert C. Innis. Mar 65, 12p NASA-TN-D-2701
Unclassified report

Descriptors: (*Short take-off planes, Hovering), (*Jet planes, Hovering).

N65-19922 Field 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AN EXPERIMENTAL INVESTIGATION OF SUPPORT INTERFERENCE ON A BLUNT BODY OF REVOLUTION AT A MACH NUMBER OF APPROXIMATELY 20,
by Charles G. Miller III. Apr 65, 27p
NASA-TN-D-2742
Unclassified report

Descriptors: (*Bodies of revolution, Hypersonic characteristics), (*Supports, Blunt bodies).

N65-20406 Field 1A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
INVESTIGATION OF AIR DAMPING OF CIRCULAR AND RECTANGULAR PLATES, A CYLINDER, AND A SPHERE,
by David G. Stephens and Maurice A. Scavullo.
Apr 65, 21p NASA-TN-D-1865
Unclassified report

Descriptors: (*Airfoils, Damping).

N65-20997 Field 1B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
ANALYTICAL STUDY OF EFFECTS OF PRODUCT OF INERTIA ON AIRPLANE SPIN ENTRIES, DEVELOPED SPINS, AND SPIN RECOVERIES,
by Ernie L. Anglin. Apr 65, 47p
NASA-TN-D-2754
Unclassified report

Descriptors: (*Moment of inertia, Spin), (*Spin, Airplanes).

N65-22364 Field 1B, 1C, 1E
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AN INVESTIGATION OF THE INFLUENCE OF AIRCRAFT TIRETREAD WEAR ON WET-RUNWAY BRAKING,
by Trafford J. W. Leland and Glenn R. Taylor.
Apr 65, 21p NASA-TN-D-2770
Unclassified report

Descriptors: (*Aircraft tires, Wear resistance), (*Runways, Aircraft tires), Moisture, Friction.

N65-22607 Field 1A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECT OF UNIFORM LONGITUDINAL STRAIN RATE ON WEAK HOMOGENEOUS TRUBULENCE IN A COMPRESS FLOW,
by Robert G. Deissler. May 65, 20p
NASA-TN-D-2800
Unclassified report

Descriptors: (*Turbulence, Correlation techniques), (*Strain(Mechanics), Compressible flow).

Patent 3,184,738 Field 1D

OBSTACLE WARNING COMPUTER.
Patent assigned to Navy,
by John D. Hague and Richard L. Lundberg.
18 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Navigational aids, Aircraft), (*Warning systems, Aviation safety), Radar navigation, Flight instruments, Patents, Computers.

The obstacle detection and warning system is for aircraft use. The circuit utilizes the input from a radar video circuit and an input from a radar sync trigger circuit with an input representative of the angle between the radar antenna beam and the flight path of the aircraft to produce outputs which provide a terrain clearance marker on an oscilloscope and audible or visual warnings of existence of obstacles in the flight path.

Patent 3,185,413 Field 1C

INTEGRAL TENSION BAR RETAINER.
Patent assigned to Navy,
by Dale W. Walker. 25 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Couplings, Catapults), (*Catapults, Couplings), Aircraft, Patents.

The holdback couplers are used in aircraft catapult launching devices. A shear pin coupler is provided for a catapult holdback which retains the shear pin pieces and permits easy coupling to a shear pin with proper positioning of the shear pin being assured. Improper connection is indicated.

Patent 3,189,127 Field 1E

UNIVERSAL WHEEL CHOCK.
Patent assigned to Navy,
by Paul Karnow and Blanchard S. Hutchins.
15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Chocks, Aircraft equipment), Aircraft carriers, Safety, Design, Ground support equipment, Patents.

The lightweight and inexpensive chocking device may be quickly interposed in operating condition and locks any size aircraft wheel with pneumatic tires against movement. The device is particularly for use with aircraft parked on the pitching and rolling decks of aircraft carriers. The structure includes a rack member and two blocks.

PB-167 722 Field 1A, 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
INTRINSIC EQUATIONS OF SPATIAL GAS FLOW,
by C. Truesdell. Jul 58, 15p
Technical summary rept. MRC-TSR-33
Contract DA11 022ORD2059
AD 203 818
Unclassified report

Descriptors: (*Gas flow, Differential equations), (*Differential equations, Gas flow), Vortices.

An organized account is given together with immediate proofs, of the main intrinsic formulae valid in a steady gas flow. (Author)

PB-167 731 Field 1A, 20C
CFSTI Prices: HC$1.00 MF$0.50

Purdue Univ., Lafayette Ind. School of Aeronautical and Engineering Sciences.
SLIP FLOW OVER A MAGNETIZED SPHERE MOVING SLOWLY IN A CONDUCTING MEDIUM,
by G. W. Pneuman and P. S. Lykoudis. Jul 61, 16p
Rept. no. A-61-1
Grant NSF G14477, Projs. 2649, Ae51
Unclassified report

Descriptors: (*Gas flow, Magnetic fields), (*Spheres, Aerodynamic characteristics), Perturbation theory, Dynamics, Electrical conductance, Boundary layer, Drag, Numerical analysis.

The recent paper by J. Barthel and P. Lykoudis ('The Slow Motion of a Magnetized Sphere in Conducting Medium; Journal of Fluid Mechanics, 8, pp307-314, 1960, Report no. A-59-11, August, 1959.) concerning the motion of a permanently magnetized sphere in an electrically conducting medium is extended to the case in which the effects of slip flow become important. The method of solution is the same as that used in the above mentioned work with the exception that the usual non-slip boundary condition is replaced by the Maxwell slip boundary condition. The drag coefficient is calculated and the effects of slip are discussed. It is found that the drag is increased due to the fact that the velocity is nonzero at the wall where the magnetic field is strongest. (Author)

02. Agriculture

Patent 3,170,784 Field 2A, 7A

PRODUCTION OF ORDINARY SUPERPHOSPHATE WITH STRONG SULFURIC ACID.
Patent assigned to TVA,
by Larrabee D. Hand, Jr. 23 Feb 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Fertilizers, Production), (*Phosphates, Fertilizers), (*Sulfuric acid, Fertilizers), Rock-(Geology), Powders, Water, Particle size, Patents.

The process is for the production of granular ordinary superphosphate fertilizer material. The process includes acidulating phosphate rock with strong sulfuric acid, holding the resulting powdery acidulate for a period of approximately 30 minutes to effect fluorine removal therefrom and then adding water to the acidulate in a rotary drum, wherein it is granulated. New and advantageous features over conventional processes for the production of superphosphate are realized by the present invention.

Patent 3,177,062 Field 2A, 7A

PROCESS OF MAKING A GRANULATED, HOMOGENEOUS PHOSPHATE ROCK SULFUR FERTILIZER.
Patent assigned to TVA,
by Travis P. Hignett and George Hoffmeister, Jr.
6 Apr 65 Unclassified patent
Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Fertilizers, Production), (*Phosphates, Fertilizers), (*Sulfur, Fertilizers), Particle size, Rock(Geology), Patents.

The product has a defined and critical particle size range which increases the effectiveness of the product as a fertilizer. The process includes blending together a mixture of pulverized phosphate rock and elemental sulfur, subsequently granulating same, and recovering granular product of a critical particle size range.

PB-167 895 Field 2B
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
THE NEW SOVIET AGRICULTURAL DECREES (SEPTEMBER PLENUM, 1953),
by Nancy Nimitz. 13 Jan 54, 96p
Research memo. no. RM-1178 Unclassified report
ATI 210 489
Available copy will not permit fully legible reproduction.

Descriptors: (*USSR, Agriculture), (*Agriculture, Economics), Production, Consumption, Distribution-(Economics), Government(Foreign), Government procurement, Animals, Cereals, Vegetables, Machines, Fertilizers, Costs, Rural areas, Tables.

Contents: The Background of Soviet Postwar Agricultural policy; The September decrees; Basic causes of agricultural backwardness; Livestock production; Potato and vegetable production; Grain, technical and oil seed crops; MTS operations; Administration of agriculture; Party political work in rural areas; Tables of basic data: Gross agricultural output at 1926/27 prices; Harvests, yields, and sown area; Output of livestock products; Livestock herds; Agricultural machinery park; Rural electrification; Application of mineral fertilizers.

03. Astronomy and Astrophysics

N65-16314 Field 3C, 4A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration,

Huntsville, Ala. George C. Marshall Space Flight Center.
THE SYNTHESIS OF METEOROID DISTRIBUTIONS FROM MONOENERGETIC MONODIRECTIONAL KERNELS,
by R. D. Shelton, H. E. Stern, J. J. Wright, and D. P. Hale. Feb 65, 31p
NASA-TN-D-2630

Unclassified report

Descriptors: (*Meteors, Distribution), (*Celestial mechanics, Meteors).

N65-18202 Field 3A, 3B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
INFRARED ASTRONOMY REVIEW,
by Gordon C. Augason and Hyron Spinrad. Mar 65, 21p NASA-TM-X-1074

Unclassified report

Descriptors: (*Astronomy, Infrared scanning), (*Infrared scanning, Astronomy).

Patent 3,143,651 Field 3B, 3A

X-RAY REFLECTION COLLIMATOR ADAPTED TO FOCUS X-RADIATION DIRECTLY ON A DETECTOR.
Patent assigned to NASA,
by Riccardo Giacconi and Bruno B. Rossi. 4 Aug 64

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Collimators, X rays), (*X rays, Collimators), Interstellar matter, Detectors, Astrophysics, Airborne, Satellites(Artificial), Patents.

The X-ray apparatus is designed to be carried aloft in satellites for performing studies of X-radiation from interplanetary, interstellar and intergallactic sources. X-ray collimating structure is positioned between an entrance aperture and a detector area. The instrument, when used with orientable platforms now available enables X-ray observations of great astrophysical importance.

PB-167 797 Field 3A
CFSTI Prices: HC$3.00 MF$0.75

Harvard Coll. Observatory, Cambridge, Mass.
AGASSIZ STATION RADIO ASTRONOMY PROJECTS.
Annual research rept. (final) for 1961.
Nov 61, 77p
Grant NSF G13418

Unclassified report

Descriptors: (*Radio astronomy, Scientific research), Galaxies, Hydrogen, Line spectrum, Lasers, Nebulae, Planets.

The research program in radio astronomy at Harvard concentrates on a number of physical experiments involving the 21 centimeter radiation of atomic hydrogen. During the past year, the activity has centered in three areas: 1. A study of the hydrogen line radiation from extragalactic nebulae; 2. A new program in which the maser has been used successfully for the first time to measure planetary radiation at 21 cm; 3. Substantial progress toward the development of a traveling wave maser for hydrogen line research.

04. Atmospheric Sciences

N65-16577 Field 4A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
DIFFUSION OF AURORAL ELECTRONS IN THE ATMOSPHERE,
by Kaichi Maeda. Feb 25, 23p
NASA-TN-D-2612

Unclassified report

Descriptors: (*Electron density, Aurorae), Diffusion, Atmospheric electricity.

PB-167 565 Field 4B, 18H
CFSTI Prices: HC$3.00 MF$0.75

Illinois Univ., Urbana. Dept. of General Engineering.
RADON-222, A STUDY OF ITS EMANATION FROM SOIL, SOURCE STRENGTH, AND USE AS A TRACER.
Final rept. for May 61-Jan 65,
by John E. Pearson. Jan 65, 84p
Grant PHS AP00134

Unclassified report

Descriptors: (*Atmospheric motion, Tracer studies), (*Radon, Natural radioactivity), (*Natural radioactivity, Radon), Radium, Radioactive decay, Soils, Meteorological parameters, Wind, Moisture, Air mass analysis, Diffusion.

Radon-222 occurs widespread throughout nature, arising from radium-226 present in practically all natural formations. Radon gas, generated within soils, diffuses into the atmosphere in measurable amounts. The rate of emanation depends on many factors, primarily soil and meteorological parameters. Equipment and techniques have been developed to measure the emanation rate of radon-222 under natural conditions. While tests have shown that the rate of emanation varied linearly with air speed at relative high flow rates, at very low wind speeds ordinarily observed just above the soil surface, the emanation is near uniform. A speed was adopted which simulates those measured in the atmosphere near the soil surface. While no variation of emanation with changes of soil moisture was observed over periods of about eight hours, for longer periods the emanation varied inversely with soil moisture. The emanation rate of radon-222 from soils into the atmosphere varied 1000-fold among geographical regions but was shown to be uniform in Champaign County, averaging 140 ± 73 x 10 to the -18 power curies per square centimeter per second. The results of the research establish the utility of naturally occuring radon-222 as a cost-free tracer in studies concerning vertical diffusion in the atmosphere. (Author)

PB-167 747 Field 4A
CFSTI Prices: HC$3.00 MF$0.75

Arctic Inst. of North America, Washington, D. C.
ANALYSIS OF PHOTOMETRIC DATA OBTAINED AT GEOMAGNETICALLY CONJUGATE STATIONS,
by Alan L. Goodman. Feb 65, 99p
Research paper no. RP-29
Grant NSF 23761

Unclassified report

Descriptors: (*Sky brightness, Optical analysis), (*Aurorae, Optical analysis), Geophysics, Meteorological phenomena, Polar regions, Optical properties, Measurement, Photometers, Correlation techniques.

The 3914A, 5577A, and 6300A emissions are monitored simultaneously at Eights Station, Antarctica and Baie St. Paul, Provence Quebec, which are geomagnetically conjugate stations. The photometers are zenith oriented with a five degree field of view. The data analyzed in this paper were obtained on the thirteenth, nineteenth, and twentieth of August, 1963. On the thirteenth of August, no aurorae were observed; on the nineteenth of August, homogeneous and rayed arcs were observed; and on the twentieth of August, type B aurorae were seen. The emissions were reduced to relative intensities and auto and cross-serial-correlation analyses were performed. From the analyses it is concluded that (1) on the thirteenth of August, the emissions were due to airglow, and this phenomenon was uncorrelated between the two stations; (2) on the nineteenth of August during an event characterized by homogeneous and rayed arcs, the 3914A emissions were highly correlated, while the 5577A and 6300A emissions were uncorrelated; and (3) on the twentieth of August during type B aurorae, it is believed the earth's field was disturbed sufficiently so that the stations were no longer conjugate, which would explain the lack of correlation for the three emission lines. (Author)

PB-167 792 Field 4A, 4B
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania State Univ., University Park.
Ionosphere Research Lab.
DETERMINATION OF D-REGION COLLISION FREQUENCY PROFILES FROM PHASE AND AMPLITUDE WAVE INTERACTION MEASUREMENTS,
by Eugene L. Day. 1965, 86p
Scientific rept. no. SR-238
Grant NSF GP846

Unclassified report

Descriptors: (*Atmospheric sounding, Radio waves), (*Ionospheric propagation, Atmospheric sounding), (*Radio waves, Atmospheric sounding), Phase measurement, Electron density, Ionosphere, Iterative methods, Least squares method, Geophysics.

In this research a technique is developed for determining D-region electron collision frequency profiles from simultaneous measurements of phase and amplitude wave interaction. An iterative least squared error procedure is used to find the best exponential collision frequency profile for the interaction measurements. The technique does not require a knowledge of the electron density, the electron temperature, or the disturbing power and accounts for the effects of the underlying ionization. Although the technique is developed for the case of a delta disturbing pulse, it is applicable to actual data since a method is described for transforming data obtained by using a finite disturbing pulse to data corresponding to a delta disturbing pulse. The approach employed is rather versatile and was extended to include determination of the time constant for cooling, (Gnu) to the minus 1 power, and the electron density distribution. (Author)

05. Behavioral and Social Sciences

AD-450 000 Field 5B
CFSTI Prices: HC$5.00

Office of Aerospace Research, Washington, D. C.
PROCEEDINGS OF THE USAF SCIENTIFIC AND TECHNICAL INFORMATION CONFERENCE (1st), 30 SEPTEMBER-4 OCTOBER, 1963 DAYTON, OHIO,
ed. by A. G. Hoshovsky. 1963, 172p OAR-15
N65 14635

Unclassified report

Descriptors: (*Information retrieval, Symposia), Documentation, Air Force operations, Air Force research, Research program administration.

The broad objective of the conference was 'to increase the effectiveness of the scientific and technical programs of the U. S. Air Force.' The more specific objective of the conference was to examine and where appropriate suggest improved and expanded means for scientific and technical information flow between those persons and organizations who generate the knowledge and those who utilize it. Underlying the conference work was the premise that efficient broad interchange of pertinent, timely, and precise technical information is necessary for the advancement of Air Force technology and that the benefits from adequate information interchange would manyfold offset the costs. Orientation speeches were presented by representatives from industry, civil government, and military agencies. Participants in the conference were formed into working groups to study specific problems in information exchange and report their conclusions. (Author)

N65-23170 Field 5J
CFSTI Prices: HC$4.00 MF$1.00

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
ATTENTION IN TIME DISCRIMINATION AND REACTION TIME,
by Alfred B. Kristofferson. Apr 65, 136p
Contract NAS2 1790
NASA CR-194

Unclassified report

Descriptors: (*Attention, Reflexes), (*Reaction-(Psychology), Attention).

PB-167 317 Field 5A, 5B
CFSTI Prices: HC$2.00 MF$0.50

Alfred P. Sloan School of Management, Mass. Inst. of Tech., Cambridge.
THE UTILIZATION OF INFORMATION SOURCES DURING R AND D PROPOSAL PREPARATION,
by Thomas J. Allen. Oct 64, 34p
Working Paper no. WP-97-64
Grant NSF GN233

Unclassified report

Research Program on the Organization and Management of R and D.

Descriptors: (*Scientific research, Research program administration), (*Research program administration, Documentation), Scientific personnel.

Twenty-two proposal competitions for government R and D contract, involving 156 proposal teams, are examined to determine the relative use of three sources of technical information. The extent to which each proposal team relied upon literature search, the use of staff specialists within the lab and the use of outside sources of information is related to the rated technical quality of its proposal, and to other variables characterizing the proposal team and its parent laboratory. Twenty-two percent of the total time expended by 156 proposal teams was devoted to the seeking and gathering of technical information. Of the three information sources used, only one, laboratory specialists, appears to be at all directly related to the technical quality of the product

and this relation is weak and unreliable. Technical quality is inversely related to the extent to which the proposal team relies upon individuals outside of the laboratory as sources of information. (Author)

PB-167 396 Field 5A, 12B
CFSTI Price: HC$1.00

RAND Corp., Santa Monica, Calif.
FORMULATING PRECISE CONCEPTS IN ORGANIZATION THEORY,
by Allen Newell and Joseph B. Kruskal, Jr.
1 Jun 51, 16p Rept. no. RM-619 Unclassified report
AD 116 565
Rept. on Proj. RAND.
Available copy will not permit fully legible reproduction.

Descriptors: (*Management engineering, Mathematical analysis), Set theory, Correlation techniques, Operations research, Vocabulary, Standardization.

An effort is made to bridge the language barrier that exist between systems analysis personnel who have vastly different backgrounds. The algebra of sets and the calculus of relations are examined as a base for constructing a language for discussing organizations.

PB-167 490 Field 5B, 6E, 9B
CFSTI Prices: HC$1.00 MF$0.50

Yale Univ., New Haven, Conn. Medical Library.
MECHANIZATION OF CATALOGUING PROCEDURES.
Revised ed.,
by Frederick G. Kilgour. 1963, 8p
Unclassified report

Prepared for presentation at the annual meeting of the Medical Library Association, San Francisco, Calif., 2 Jun 64.

Descriptors: (*Libraries, Medicine), (*Indexes, Medicine), (*Documentation, Computers), (*Information retrieval, Medical research), Catalogs, Subject indexing, Punched cards, Programming (Computers), Bibliographies, Costs.

The prime objective of the Columbia-Harvard-Yale Medical Libraries Computerization Project is the rapid and complete retrieval of bibliographic information. The three libraries intend to institute a system whereby the cataloguing information for books in their collections and published in 1960 or later will be contained in a random access memory unit attached to a computer. They also hope that the MEDLARS indexing of those journals supplying upwards of 75 per cent of recorded use in the three libraries will be included in the same memory. Each library will be connected to the computer over telephone lines and can ask the computer through remote information terminals for references on various subjects with limitations, if desired, as to date, place, and language of publication. The references will be supplied to the inquirer immediately - the effective speed of response being limited only by the ability of the terminals to print the references.

PB-167 508 Field 5A, 9B
CFSTI Prices: HC$1.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.
Aeronautical Chart Div.
AUTOMATIC DATA PROCESSING SYSTEM OF COST ACCOUNTING AND PRODUCTION MANAGEMENT.
Aug 64, 21p Unclassified report

Descriptors: (*Management control systems, Data processing systems), (*Data processing systems, Management control systems), (*Economics, Data processing systems), Costs, Automatic, Production control, Management planning, Budgets, Wages.

This system of reporting was developed to provide an automatic method of collecting data for Cost Accounting, Production Management, and Payroll Input purposes. It was brought about by the necessity of developing a system which would be adaptable to the manual application of information at the working level, with a minimum of effort, and supply the input for key punching IBM cards by the Electronic Computing Division. These data are utilized by management in the planning and routing of work, estimating chart costs and reimbursable work, establishing financial and budget plans and devising operational standards for work performed in the Aeronautical Chart Division. (Author)

PB-167 630 Field 5B, 14E
CFSTI Prices: HC$0.50 MF$0.50

Federal Council for Science and Tech., Washington, D. C.
FEDERAL MICROFICHE STANDARDS.
Ed. no. 1.
Aug 65, 13p
Unclassified report

Descriptors: (*Photographic images, Standards), (*Photographic film, Specifications), (*Documentation, Photographic film), Reports.

The general characteristics of the COSATI (Committee on Scientific and Technical Information) microfiche include (1) size of 105 x 148.75 mm + 0-0.75 mm, (2) duplicate film thickness between 0.007 and 0.008 inch, with standards for tolerance of film thickness of the American Standards Association to apply, (3) base material conforming to American Standard Safety Film (ASA, PH1.25-.956), (4) reduction ratio for original filming not to exceed 20:1, and (5) distribution copies to have all document pages, including text and halftones, printed in negative form. The specifications have sections concerning (1) filming requirements of the microimage area, (2) requirements in the title area (initial microfiche for each report), (3) document image area requirements (initial microfiche for each report), (4) image area requirements-trailer microfiche, and (5) quality.

PB-167 649 Field 5B, 9B
CFSTI Prices: HC$4.00 MF$1.00

Information Technology Labs., Waltham, Mass.
Information Sciences Dept.
MANUAL OF BASIC OPERATIONS FOR THE DOCUMENT DATA INDEXING SET AN/GSQ-26,
by Lawrence Buckland, William Nugent, William Bivona, and John Neville. 28 Oct 60, 147p
Rept. no. RPIS-60-14
Contracts AF30 602 2063, NSF C88
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Special purpose computers, Information retrieval), (*Information retrieval, Special purpose computers), Subject indexing, Reports, Data, Documentation, Magnetic tape, Programming(Computers), Wiring diagrams, Instruction manuals.

The United States Air Force AN/GSQ-26 Document Data Indexing Set is a special purpose computer designed to scan through alphanumeric data, match

the data with a prescribed question, and print any or all of the data which matches the question. The primary use of the AN/GSQ-26 is to search indexes to library documents and produce the document accession number pertinent to each question. The Record Mode of the AN/GSQ-26 records index data onto magnetic tape storage. The Question Insert Mode loads the question into the machine. The Search Mode searches the data contained in the file. The Edit Mode is used to update the file. In addition there is a Print Mode which produces an output of all of the index data stored for any document. A graphic description of the operation, speed, and capacity of the AN/GSQ-26 is shown below. The major portion of the manual contains detailed instructions for operating, programming, and plugboard wiring for the machine. (Author)

PB-167 672 Field 5B
CFSTI Prices: HC$2.00 MF$0.50

Yale Univ., New Haven, Conn. Dept. of History of Science and Medicine.
A STATISTICAL STUDY OF SCIENTIFIC AND TECHNICAL JOURNALS,
by Donald de B. Beaver. 1 Nov 64, 41p
Grant NSF GN299

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Periodicals, Statistical analysis), (*Reports, Statistical analysis), (*Scientific research, Periodicals), Documentation.

PB-167 675 Field 5I, 9B
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
CONSTRUCTION AND USE OF THE SCHOOL SIMULATION VEHICLE,
by John F. Cogswell, Robert L. Egbert, Donald G. Marsh, and Frank A. Yett. 1 Sep 64, 21p
Technical memo. no. TM-2084
Grant 7 14 9120 217

Unclassified report

Prepared for presentation at the Annual Convention of the American Psychological Association (72nd), 4 Sep 64, Los Angeles, Calif.

Descriptors: (*Education, Models(Simulations), Systems engineering, Computers, Decision making, Students, Learning, Experimental data, Simulation.

A project is described which makes use of techniques relatively new to educational research--systems analysis and computer simulation. The purpose of the research is to find new solutions to implementing instructional media through analysis and simulation of school organization. The high school is the basic unit for investigation in the study. The procedure proposed will be to work back and forth between simulated data and data obtained from the real environment. It is concluded that the real test of validity will be successfully met when the experimenter can change the organization within the model and obtain predicted effects that are later substantiated by the same sequence of events in the real environment.

PB-167 676 Field 5B, 6O
CFSTI Prices: HC$4.00 MF$1.00

Institute for Advancement of Medical Communication, Bethesda, Md.
DRUG INFORMATION FOR THE BIOMEDICAL COMMUNITY. A REPORT OF A PRELIMINARY STUDY OF THE NEEDS FOR A NATIONAL DRUG INFORMATION CLEARINGHOUSE,
by William C. Spring, Jr. and Frank Honicker, Jr.
Oct 63, 127p
Contract PH86 63 130

Unclassified report

Descriptors: (*Information retrieval, Drugs), (*Drugs, Information retrieval), Periodicals, Indexes, Libraries, Abstracting, Documentation, Medicine, Biology, Medical personnel.

The purpose of the study is to provide expert opinion on (1) the information needs and resources of the potential users of a National Drug Information needs and (2) the potential values, scope, limitations, and developmental problems of such a service.

PB-167 775 Field 5B
CFSTI Prices: HC$2.00 MF$0.50

Engineers Joint Council, New York.
INFORMATION SYSTEMS - ESSENTIAL TOOLS IN ENGINEERING APPLICATION OF SCIENCE FOR THE NEEDS OF SOCIETY.
1962, 30p

Unclassified report

Proceedings of a panel program jointly sponsored by Engineers Joint Council and Section M (Engineering)-AAAS annual meeting (129th), Philadelphia, Pa., 27 Dec 62.

Descriptors: (*Engineering, Documentation), (*Scientific research, Documentation), (*Documentation, Engineering), Engineering personnel, Indexes, Subject indexing, Information retrieval, Libraries, Chemical engineering, Abstracting, Periodicals, Reviews.

Contents (review of facilities for making recorded information for engineers readily accessible):
An information center for engineers, by Ralph Phelps
The Engineering Index, a catalyst for information retrieval, by Carolyn M. Flanagan
Information Services of the American Institute of Chemical Engineers, by Bart E. Holm
An action plan for the engineering profession, by Eugene Wall
Information resources for tomorrow's engineers, by Walter M. Carlson

PB-167 787 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Case Inst. of Tech., Cleveland, Ohio. Operations Research Group.
A RESEARCH PROPOSAL ON THE EFFECT OF COMPRESSION OF SCIENTIFIC ARTICLES ON READER COMPREHENSION.
26 Jul 60, 20p

Unclassified report

Descriptors: (*Documentation, Operations research), (*Abstracting, Documentation), (*Scientific personnel, Reading), Scientific research, Reports, Printing, Effectiveness, Costs, Periodicals.

The hypothesis was developed that the length of a scientific article is a major variable related both to reading effectiveness and to printing costs. A pilot experiment was conducted to develop and test methods for experimentally evaluating the hypothesis. A related objective was to obtain preliminary empirical data and to develop information needed for the design of a full scale experimental program.

PB-167 831 Field 5B, 9F
CFSTI Prices: HC$3.00 MF$0.75

Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF REQUIREMENTS FOR ESTABLISHMENT AND OPERATION OF A TRANSDUCER INFORMATION CENTER.
Final rept. for 15 Apr 63-14 Apr 64,
by W. E. Chapin, G. L. McCann, and W. H. Veazie.
Mar 65, 75p Rept. no. G-6490
Contract AF33 657 11083, Proj. 4107, Task 410719
FDL TDR-64-34, AD 460 944
Unclassified report

Descriptors: (*Transducers, Information retrieval), (*Information retrieval, Transducers), Abstracting, Catalogs, Indexes, Subject indexing, Costs, Operation, Telemeter systems, Documentation, Operations research.

A program was initiated by conducting a study of existing information centers to determine whether or not some such organization was active in disseminating transducer information. Letters of inquiry were distributed to approximately 200 researchers, users, and manufacturers of transducers. The replies to these inquires helped define the types of service desired from a tranducer information center, types of tranducer information needed for providing this service to the technical community, proper selection of storage and retrieval techniques, and the qualifications of technical personnel needed to process information and provide technical assistance. The second phase of the program involved the operation of a pilot transducer information center to study problems that will be faced in the operation of a matured information center. Approximately 600 selected transducer documents were processed during the pilot-operation phase. These documents were abstracted and extracted for storage in the information center and for publication in quarterly accessions listings. (Author)

PB-167 845 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
LES BULLETINS BIBLIOGRAPHIQUES INDEXES, INSTRUMENTS DE LA RECHERCHE DOCUMENTAIRE. APPLICATIONS DANS LES SCIENCES ET TECHNIQUES NUCLEAIRES,
by M. A. Chonez. Oct 64, 12p Rept. no. CEA-TP-2655
Text in French. Unclassified report
Descriptors: (*Nuclear physics, Documentation), (*Indexes, Information retrieval), Bibliographies, Reports, France.

Le bulletin bibliographique indexe demeure encore, apres l'apparition des machines de traitement automatique de l'information, l'un des instruments les plus efficaces de la recherche documentaire. Mais il devient de plus en plus necessaire, afin de lui conserver cette efficacite, de recourir a ces memes machines pour faciliter et accelerer sa preparation. Trois realisations caracteristiques sont brievement decrites: celles de 'Nuclear Science Abstracts' et de l'AED Information Service', ou la mecanisation n'est qu'un auxiliaire de la preparation materielle des index, et celle de 'Physindex', dans laquelle l'elaboration meme de l'index est automatique. En conclusion, est esquissee la politique future du que future du Service Central de Documentation du C.E.A. dans ce domaine. (Author)

PB-167 939 Field 5B
CFSTI Prices: HC$1.00 MF$0.50

Western Reserve Univ., Cleveland, Ohio. Center for Documentation and Communication Research.
A SELECTED BIBLIOGRAPHY OF DOCUMENTATION AND INFORMATION RETRIEVAL.
Oct 64, 14p
Unclassified report

Descriptors: (*Documentation, Bibliographies), (*Information retrieval, Bibliographies), Medicine, Education, Libraries, Theory.

The citations for the bibliography are divided into 5 groups: Information retrieval --- general; information retrieval theory; medicine; educational research information; and Library education.

PB-167 944 Field 5H, 9B, 5G
CFSTI Prices: HC$1.00 MF$0.50

Massachusetts Inst. of Tech., Cambridge. Electronic Systems Lab.
THEORETICAL FOUNDATIONS FOR THE COMPUTER-AIDED DESIGN SYSTEM,
by Douglas T. Ross and Jorge E. Rodriguez. 1963, 18p
Contract AF33 600 42859
Unclassified report

Pub. in Proceedings, Spring Joint Computer Conference, p305-22, 1963. Available copy will not permit fully legible reproduction.

Descriptors: (*Systems engineering, Computers), (*Computers, Systems engineering), Design, Theory, Programming languages, Language, Theory, Algebra, Computer storage devices, Humans.

Contents:
Approach to the computer-aided design system
Necessity for an evolutionary approach
Plex structures for problem modeling, where a plex is an interconnected set of n-component elements
Role of language
Outline of the algorithmic theory of language (see AD-296 998)
Growth of complex structures
General principles
First pass-algorithm; parsing algorithm
Meaning and the precedence string; precedence algorithm
Transformation from language to plex models
Concept of a modelling plex
Operators for plex transformations
Operator examples
Design system in use
General description; servomechanism design example.

SB-542 Field 5B, 5A

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
TECHNICAL AND FOREIGN-LANGUAGE DICTIONARIES.
Price list, selective bibliography of government research repts. and translations through Mar 65.
Mar 65, 19p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Bibliographies, Scientific research), (*Dictionaries, Scientific research), Aeronautics, Ammunition, Astronautics, Biology, Plants(Botany), Chemistry, Chemical engineering, Computers, Data processing systems, Information retrieval, Documentation, Electronics, Guided missiles, Instrumentation, Machine translation, Mathematics, Metallurgy, Military strategy, Nuclear physics, Optical equipment, Paints, Physics, Semiconductors, Telemeter systems.

Lists 288 references on technical and foreign-language dictionaries added to the CFSTI collection through March 1965 in subjects such as: Aeronautics; Ammunition; Astronautics; Biology; Botany; Chemistry and Chemical Engineering; Computers, Data Processing and Information Retrieval; Documentation; Electronics; Guided Missiles; Instrumentation; Machine Translation; Mathematics; Metallurgy; Military Science and Engineering; Nuclear Physics and Engineering; Optical Equipment; Paints; Physics; Semiconductors; Telemeter Systems; et cetera.

06. Biological and Medical Sciences

AD-279 216 Field 6C, 12A
CFSTI Prices: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON THE PROBABILITY OF FIXATION OF MUTANT GENES IN A POPULATION,
by Motoo Kimura. Nov 61, 13p
Technical summary rept. no. MRC-TSR-275
Contract DA11 022ORD2059

Unclassified report

Descriptors: (*Genetics, Probability), (*Probability, Genetics), Mutations, Population, Statistical analysis.

AD-430 401 Field 6A, 6P
CFSTI Prices: HC$1.00

Max-Planck-Institut fuer Immunbiologie, Freiburg im Breisgau (West Germany).
RESEARCH ON THE PRODUCTION AND IMMUNOLOGICAL EXAMINATION OF ARTIFICIAL ANTIGENS CONTAINING KNOWN SUGARS (OF OLIGO-SACCHARIDES) AS THE DETERMINANT GROUPS, IN RELATION TO THE IMMUNO-CHEMICAL ANALYSIS OF ENTEROBACTERIAL O-ANTIGENS (ENDOTOXINS).
Final technical rept. for 1 Dec 62-30 Nov 63,
by Otto Westphal. 30 Nov 63, 9p
Contract DA91 591EUC2770
N64 16098

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Immunology, Carbohydrates), (*Antigens + Antibodies, Carbohydrates), (*Carbohydrates, Immunology), (*Toxins + Antitoxins, Chemical properties), Enterobacteriaceae, Bacterial extracts, Polysaccharides, Proteins, Fatty acid esters, Lipids, Molecular weight, Phosphoric acids, West Germany.

Main efforts were concentrated on: (1) Methods for the transformation of bacterial O-specific polysaccharide haptens into full antigens. Two methods were worked out, namely (a) Preparation of p-aminobenzyl ethers of the polysaccharides which were then diazotized and coupled to proteins, giving polysaccharide benzylazo proteins. (b) The polysaccharides were allowed to react with epichlorohydrine in slightly alkaline solution resulting in cross-linking of polysaccharide units to larger (soluble or insoluble) particles. (2) Studies on the influence of certain substituents after their introduction into the polysaccharide(s) with respect to the antigenicity of the artificial polysaccharide complexes. Special emphasis was put on the esterification of the polysaccharide component with long-chain fatty acids 'Lipoidisation'. Also the introduction of charged groups was included (phosphorylation). (Author)

AD-447 341 Field 6P, 6D, 6S
CFSTI Prices: HC$1.00 MF$0.50

Foreign Technology Div., Wright-Patterson AFB, Ohio.
JOURNAL OF PHYSIOLOGY, VOL. 9, NO. 2, 1963 (SELECTED ARTICLES),
12 Aug 64, 21p FTD-TT-64-386
TT 65-62487

Unclassified report

Unedited rough draft trans. of Fiziologichynyi Zhurnal (USSR) v9 n2 p151-7, 273-4, 274-6 1963.

Descriptors: (*Physiology, Reports), (*Cybernetics, Theory), (*Digestive system, Recording systems), Oscillographs, Electronic recording systems, Eye, Rotation, Vestibular apparatus, USSR.

Contents: On the principle of the philosophical problem of biological cybernetics; Floating recording device for investigation of material function of organs of the digestive system; and Recording Nystagmus with the aid of a strain gauge and an oscillograph.

HW-82153 (Rev 1) Field 6R
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
DESIGN CRITERIA FOR RADIOSURGERY FACILITY, BUILDING NO. 748,
by Edgar F. Smith. 20 Nov 64, 18p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Hospitals, Radiobiology), (*Radiobiology, Surgery).

N65-17876 Field 6S
CFSTI Prices: HC$1.00 MF$0.50

Texas Institute for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION,
by C. Vallbona, F. B. Vogt, D. Cardus, W. A. Spencer, and M. Walters. Mar 65, 14p
Contract NAS9 1461
NASA CR-171

Unclassified report

Descriptors: (*Relaxation(Physiology), Reviews).

N65-18214 Field 6S
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
EFFECT OF COMBINED LINEAR AND OSCILLATORY ACCELERATION ON PILOR ATTITUDE-CONTROL CAPABILITIES,
by Constantine B. Dolkas and John D. Stewart.
Mar 65, 39p NASA-TN-D-2710

Unclassified report

Descriptors: (*Acceleration tolerance, Pilots), (*Attitude control systems, Human engineering).

N65-18501 Field 6S, 9B
CFSTI Prices: HC$3.00 MF$0.75

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION

PART IV. A SYSTEM FOR PROCESSING DATA COLLECTED IN THE IMMOBILIZATION STUDY UNIT,
by C. Vallbona, W. A. Spencer, W. Blose, D. Cardus, and F. B. Vogt. Mar 65, 72p
Contract NAS9 1461
NASA CR-174

Unclassified report

Descriptors: (*Relaxation(Physiology), Data processing systems), (*Data processing systems, Relaxation(Physiology)).

N65-18502 Field 6S
CFSTI Prices: HC$2.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART IX. THE EFFECT ON THE VITAL SIGNS AND CIRCULATORY DYNAMICS,
by C. Vallbona, W. A. Spencer, F. B. Vogt, and D. Cardus. Mar 65, 35p
Contract NAS9 1461
NASA CR-179

Unclassified report

Descriptors: (*Relaxation(Physiology), Blood circulation), (*Blood circulation, Relaxation-(Physiology)).

N65-20471 Field 6S
CFSTI Prices: HC$1.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART III. BIOINSTRUMENTATION,
by F. B. Vogt, R. J. Lamonte, J. R. McConnell, T. O. Hallen, and C. Vallbona. Apr 65, 11p
Contract NAS9 1461
NASA CR-173

Unclassified report

Descriptors: (*Relaxation(Physiology), Cardiovascular system), (*Cardiovascular system, Electronic recording systems).

N65-20472 Field 6S
CFSTI Prices: HC$1.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART VII. CARDIAC AND VENTILATORY RESPONSE TO THE BICYCLE ERGOMETER TEST,
by D. Cardus, W. A. Spencer, C. Vallbona, and F. B. Vogt. Apr 65, 18p
Contract NAS9 1461
NASA CR-177

Unclassified report

Descriptors: (*Relaxation(Physiology), Tolerances-(Physiology)), (*Tolerances(Physiology), Exercise).

N65-20473 Field 6S
CFSTI Prices: HC$2.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART XI. THE EFFECT OF BEDREST ON BLOOD VOLUME, URINARY VOLUME, AND URINARY ELECTROLYTE EXCRETION,
by F. B. Vogt, W. A. Spencer, D. Cardus, and C. Vallbona. Apr 65, 27p
Contract NAS9 1461
NASA CR-181

Unclassified report

Descriptors: (*Relaxation(Physiology), Blood volume), (*Urine, Relaxation(Physiology)).

N65-20474 Field 6S
CFSTI Prices: HC$3.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART XII. THE EFFECT OF BEDREST ON BONE MASS AND CALCIUM BALANCE,
by F. B. Vogt, P. B. Mack, W. G. Beasley, W. A. Spencer, and D. Cardus. Apr 65, 50p
Contract NAS9 1461
NASA CR-181

Unclassified report

Descriptors: (*Relaxation(Physiology), Bone), (*Calcium, Relaxation(Physiology)).

N65-21738 Field 6S
CFSTI Prices: HC$1.00 MF$0.50

Texas Inst. for Rehabilitation and Research, Houston.
THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION PART XIV. EFFECT OF BEDREST ON PLASMA LEVELS AND URINARY EXCRETION OF 17-HYDROXYCORTICOSTEROIDS,
by D. Cardus, C. Vallbona, F. B. Vogt, W. A. Spencer, and H. S. Lipscomb. Apr 65, 13p
Contract NAS9 1461
NASA CR-184

Unclassified report

Descriptors: (*Relaxation(Physiology), Corticosteroid agents), (*Corticosteroid agents, Relaxation(Physiology)).

Patent 3,183,099 Field 6H

PREPARATION OF FLAVOR COMPOSITIONS.
Patent assigned to Agriculture,
by Thomas H. Schultz and William C. Rockwell.
11 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Food, Preparation), Oils, Fruits, Taste, Condiments, Patents.

Flavoring agents may be prepared from orange oil, lemon oil, clove oil, grape essence, cassia oil, coffee essence and other products. The flavoring agent is rapidly emulsified into the molten sugar base so that the final products contain a matrix of amorphous sugar with the flavoring agent in the form of very minute particles dispersed uniformly throughout the sugar matrix.

Patent 3,183,908 Field 6E

PUMP OXYGENATOR SYSTEM.

Patent assigned to Navy,
by Samuel C. Collins and Ernest M. Barsamian.
18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Mechanical organs, Design), (*Medical equipment, Mechanical organs), Pumps, Oxygen equipment, Patents.

The pump-oxygenator reproduces the functions of the cardiac and pulmonary organs of a human or animal during open-heart surgery. It derives blood from the patient's venous system and from blood seeping into the operating area. Compressed oxygen first operates the engine driving the oxygenating apparatus and then oxygenates the blood. The apparatus can be autoclaved as a complete unit which obviates taking it apart for sterilizing.

Patent 3,185,348 Field 6H

BEVERAGE RECONSTITUTING AND DISPENSING DEVICE.
Patent assigned to Navy,
by George A. Pollak and Alexander Spear. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Food dispensing, Dehydrated foods), (*Dehydrated foods, Food dispensing), (*Milk, Food dispensing), Beverages, Ships, Refrigeration systems, Pumps, Pipes, Patents.

The dispensing unit is for reconstituted beverages such as milk. The liquid concentrate or powdered milk is received in a plastic one-use container and is reconstituted in the unit which is designed for shipboard use. The unit includes a tubing circuit, a metering dispenser, a refrigerating unit and an impulse pump. The beverage is reconstituted and dispensed in a uniformly qualitative and quantative manner.

Patent 3,185,580 Field 6H

PROCESS FOR MAKING PUFF SPRAY DRIED NONFAT DRY MILK AND RELATED PRODUCTS.
Patent assigned to Agriculture,
by Francis P. Hanrahan, Raymond W. Bell and Byron H. Webb. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Milk, Dehydrated foods), (*Dehydrated foods, Milk), Processing, Pasteurization, Heat treatment, Liquids, Solids, Gases, Sprays, Mixtures, Patents.

The process relates to the manufacture of dried products such as whole milk, skim milk, buttermilk, whey, chocolate milk and the like from lacteal materials. The material is heated at a time-temperature combination sufficient to at least pasteurize it, the heat-treated liquid is concentrated to a solids content up to about 65 percent, a relatively insoluble, innocuous gas at a pressure in excess of the hydraulic pressure on the concentrate is injected into the concentrate, and the gas-concentrate mixture is immediately spray dried to produce a free-flowing dried milk product, all in a continuous process.

Patent 3,189,521 Field 6F

DIAMINO- AND TRIAMINO-S-TRIAZINES AS CHEMOSTERILANTS FOR INSECTS.
Patent assigned to Agriculture,
by Alexej B. Borkovec and Paul H. Terry. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Azines, Insect control), (*Pest control, Azines), Insects, Fertility, Reproduction(Physiology), Patents.

The chemosterilants make insects sterile. They are effective against the house fly, the codling moth, screwworm flies and other insects. The compounds, are active in food additives, as residual coatings which the insect touch and by direct topical application. One of the compounds is 2,4,6-tris(dimethylamino)-s-triazine.

PB-167 404 Field 6A, 7C
CFSTI Prices: HC$1.00 MF$0.50

Bjorksten Research Labs., Inc., Madison, Wis.
PROTEIN STRUCTURE AND AGING CROSSLINKING IN GELATIN. 1. FORMALDEHYDE-INDUCED,
by Howard L. Gottlieb. Nov 54, 16p
Technical note no. TN-1
Contract AF18 600 1010, Proj. R351 40 13
AFOSR TN-54-304; AD 52 015
Unclassified report

Descriptors: (*Proteins, Molecular structure), (*Gelatins, Chemical bonds), (*Aging (Physiology), Proteins), Peptides, Formaldehyde, Hydrolysis, Amino acids, Chromatographic analysis, Metabolism.

Crosslinks in proteinaceous materials could be of numerous chemical types. In order to study the chemical characteristics of crosslinked native proteins some chemical properties of experimentally induced crosslinks were investigated. Purified pigskin gelatin has been treated with chemical reagents to induce crosslinks and the treated gelatin analyzed to describe the probable crosslinking mechanisms. Polypeptide degradation by enzymatic and ionic methods was done in order to obtain different types of hydrolytic liberation of individual amino acids. The products of degradation were subjected to paper strip chromatographic analysis by the master overlay dimensional technique. Qualitative and quantitative differences in the selective rates of liberation of certain individual amino acids indicated the locations and types of crosslinks induced by the reactions of chemical reagents in pigskin gelatin. (Author)

PB-167 946 Field 6D, 9B, 5H
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SKETCHPAD: A MAN-MACHINE GRAPHICAL COMMUNICATION SYSTEM,
by Ivan E. Sutherland. 1963, 18p
Unclassified report

Pub. in Proceedings, Spring Joint Computer Conference p329-46 1963. Available copy will not permit fully legible reproduction. Original thesis available as AD-404 549, $3.00.

Descriptors: (*Pattern recognition, Display systems), (*Digital computers, Pattern recognition), Geometric forms, Pictures, Topology, Programming(Computers), Input-output devices, Graphics.

The Sketchpad system makes it possible for a man and a computer to converse rapidly through the medium of line drawings. Heretofore, most interaction between man and computers has been slowed down by the need to reduce all communication to written statements that can be typed; in the past, we have been writing letters to rather than conferring with our computers. For many types of communication, such as describing the shape of a mechanical part or the connections of an electrical circuit, typed statements can prove cumbersome. The Sketchpad system, by eliminating typed statements (except for legends) in favor of line drawings, opens up a new area of man-machine communication. (Author)

SB-482 Suppl. 1 Field 6Q, 15B

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
PROTECTIVE CLOTHING AND OTHER APPAREL. Price list, selective bibliography of Government research repts. and translations for Nov 61-Nov 64.

Apr 65, 15p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Protective clothing, Bibliographies), Pressure suits, Flight clothing, Buoyancy, Textiles, Camouflage, Clothing, Gasproof clothing, Fire protective clothing, Underwater clothing, Helmets.

Lists 196 domestic and foreign references on protective clothing and other apparel added to the CFSTI collection during the period November 1961 to November 1964. Includes research on the development, design and evaluation of protective clothing such as: pressure suits, flight clothing, buoyant materials (textiles), camouflage clothing, gasproof clothing, fire-protective clothing, underwater clothing and space helmets. Discusses clothing used as a protection from radiation effects, X-rays, radiological contaminants, meteorological conditions, heat transfer, and toxic chemicals.

SC-RR-65-47 Field 6M
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
PRELIMINARY REPORT ON MICROBIOLOGICAL STUDIES IN A LAMINAR DOWN-FLOW CLEAN ROOM,
by V. E. Arnold, A. J. Jack, and J. G. King.
Feb 65, 27p
Contract AT(29-1)-789

Unclassified report

Descriptors: (*Microorganisms, Airborne), (*Contamination, Control).

UCRL-11948 Field 6R, 7E
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
BIO-ORGANIC CHEMISTRY ANNUAL REPORT, DECEMBER 1963 THROUGH DECEMBER 1964.
9 Feb 65, 36p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Radiobiology, Radiation chemistry), (*Radiation chemistry, Radiobiology).

07. Chemistry

GEAP-4540 Field 7A
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
SODIUM MASS TRANSFER. XIII. THE DETERMINATION OF TOTAL CARBON IN SODIUM,
by W. W. Sabol, D. Dutina, and D. E. Rey. Jun 64, 24p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Sodium, Transport properties), (*Carbon, Chemical analysis).

GEAP-4544 Field 7B
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THE OXIDATION OF ANION-DEFICIENT ZIRCONIA AND ITS RELATIONSHIP TO THE OXIDATION OF ZIRCONIUM,
by D. L. Douglass and Carl Wagner. 31 Jul 64, 20p
EURAEC-1269
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Zirconium, Oxidation), (*Oxygen, Diffusion).

LA-3134 Field 7B, 11F
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE DETERMINATION OF SILICON IN PLUTONIUM METAL AND ALLOYS USING PERCHLORIC ACID DEHYDRATION,
by Arthur L. Henicksman, Charles T. Apel, and William H. Ashley. Aug 64, 10p N64-33066
Contract W-7405-eng-36

Unclassified report

Descriptors: (*Plutonium alloys, Chemical analysis), (*Silicon, Plutonium).

N65-20484 Field 7B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF OXYGEN IN POTASSIUM.
Mar 65, 31p NASA-TM-X-1085

Unclassified report

NASA Round-Robin Meeting Held 4 Jun 64.

Descriptors: (*Potassium, Impurities), (*Oxygen, Chemical analysis).

ORNL-3679 Field 7E, 7C, 7D, 7B
CFSTI Prices: HC$4.00 MF$1.00

Oak Ridge National Lab., Tenn.
CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING JUNE 20, 1964.
Sep 64, 152p Unclassified report
Contract W-7405-eng-26

Descriptors: (*Nuclear physics laboratories, Chemistry), (*Chemistry, Nuclear physics laboratories).

Patent 3,183,061 Field 7B

XENON TETRAFLUORIDE AND PROCESS OF MAKING SAME.
Patent assigned to AEC,
by Howard H. Claassen, Henry Selig, and John G. Malm. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231 $0.25

Descriptors: (*Helium group gases, Separation), (*Xenon, Separation), (*Fluorides, Synthesis(Chemistry)), Fluorine, Handling, Patents.

The process can be used for the separation of xenon from other noble gases, such as helium, argon and krypton. The xenon tetrafluoride can serve as a convenient composition for shipping xenon and/or fluorine in compact form. The xenon tetrafluoride is prepared by reacting xenon gas and fluorine gas at from 350 to 450 degrees C. for about 20 minutes and then rapidly cooling the product formed by immersion in a water bath to room temperature.

Patent 3,183,250 Field 7C, 11I, 15B

EPOXIDES FROM ETHYLENIC COMPOUNDS CONTAINING ELECTRON-WITHDRAWING GROUPS.
Patent assigned to Army,
by David H. Rosenblatt and Gordon H. Broome.
11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Organic oxygen compounds, Synthesis-(Chemistry)), (*Vesicants, Synthesis(Chemistry)), (*Epoxy plastics, Preparation), Ethylene oxide, Alkenes, Oxidation, Nitriles, Chlorine compounds, Chemical warfare agents, Patents.

The compounds are useful as monomers to prepare resins. The compound 2,2-dicyano-3-o-chlorophenyl oxirane is a strong vesicant and is useful as a chemical warfare agent.

Patent 3,185,548 Field 7A, 6R

PROCESS OF MAKING RADON FLUORIDE AND OF SEPARATING RARE GASES FROM EACH OTHER.
Patent assigned to AEC,
by Paul R. Fields, Moshe H. Zirin and Lawrence Stein.
25 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Radon, Fluorides), (*Fluorides, Radon), Helium group gases, Synthesis(Chemistry), Separation, Cancer, Chemical compounds, Radiotherapy, Patents.

Radon fluoride is useful for the topical treatment of cancer cells and other malignancies. It is prepared by admixing fluorine gas of a pressure between 300 and 800 mm. Hg. to radon, heating the gas mixture to from 400 to 500 degrees C. whereby radon fluoride is formed. The radon fluoride is then separated from unreacted fluorine gas.

PB-167 820 Field 7D
CFSTI Prices: HC$5.00 MF$1.00

Institute of Tech., Univ. of Minnesota, Minneapolis.

STUDY OF INTRAPARTICLE DIFFUSION EFFECTS IN A GAS PHASE CATALYTIC REACTION,
by Robert E. Schilson and Neal R. Amundson. 1960, 171p
Grant NSF G2402
Unclassified report

Descriptors: (*Catalysis, Theory), (*Reaction kinetics, Catalysis), Catalysts, Mathematical analysis, Differential equations, Mass-energy relation, Surface properties, Solids, Porous materials, Gases.

In heterogeneous gas phase catalytic reactions carried out on porous solid catalysts, three distinct processes may be defined, namely: (1) The mass transfer of reactants and products to and from the main fluid body and the gross exterior surface of the catalyst particle. (2) The diffusional and flow transfer of reactants and products into and out of the interior pore structure of the particle. (3) The reaction of the reactant molecules on the solid surface of both the interior pore walls and the exterior surface of the particle. It was the purpose of this thesis to investigate, theoretically, these processes as they affect the over-all activity of a solid catalyst in a chemical reaction. This was done by deriving the basic differential equations of conservation of energy and mass for the general case of simultaneous reactions on a spherical catalyst pellet. The system of differential equations was then solved for specific cases which will be discussed later.

SB-419 Rev., Suppl. 1 Field 7A, 13B

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
DESALINATION OF WATER.
Price list, selective bibliography of government research repts. and translations for Jul 62-Feb 65.
Feb 65, 11p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Sea water, Desalination), (*Desalination, Sea water), (*Bibliographies, Desalination), Freezing, Adsorption, Hydrates, Distillation, Distilling plants, Nuclear reactors.

Lists 131 references on desalination of water added to the CFSTI collection during the period July 1962 to February 1965. Includes research on demineralization of sea water by freeze separation method, by electrically induced adsorption of porous carbon electrodes, and by hydrate process; distilling sea water by vapor compression, by direct freeze separation process, flash distillation process, and by utilizing solar energy; saline water demonstration plants; desalination by electrosorption and desorption, and by nuclear and heavy water reactors; nuclear powered sea water distillation plants; and design of basis-type solar still.

UCRL-7992 Field 7E, 18D
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
NOTE CONCERNING AN ELECTRICAL HEATER ERROR IN THE ROCKING-BOMB SOLUTION CALORIMETERS,
by Stuart R. Gunn. 29 Jul 64, 9p
N64-31057
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Nuclear physics laboratories, Instrumentation), (*Chemistry, Nuclear physics laboratories).

08. Earth Sciences and Oceanography

AD-445 874 Field 8L
CFSTI Price: HC$3.00

Cold Regions Research and Engineering Lab., Hanover, N. H.
ICE PREDICTION CURVES FOR LAKE AND RIVER LOCATIONS IN CANADA,
by M. A. Bilello. Jul 64, 58p
Research rept. no. RR-129
Unclassified report

Descriptors: (*Ice, Mathematical prediction), Canada, Climatology, Bays, Lakes, Rivers, Atmospheric temperature, Correlation techniques, Graphics.

A method was developed for predicting ice formation by utilizing the relationship between mean daily temperatures and the date of ice formation. From this relationship, a series of curves were developed to provide a simple operational method for predicting ice formation at 1 bay, 10 lake and 17 river locations in Canada. Fort Good Hope, on the Mackenzie River, was one of the locations studied and is used as an example in this report. The study shows how the numerical constants were derived and how normal air temperatures were applied to obtain the ice prediction curves. The procedures for using these curves are explained and a unique application, in which air-temperature forecasts may be used, is presented. Other pertinent information gained from the study is discussed.

CAPE-1176 Field 8J

Lane-Wells Co., Houston, Tex.
SEDIMENT DENSITY METER.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Densimeters, Sedimentation), (*Sedimentation, Densimeters), Mechanical drawings.

A sediment density meter was developed for in situ measurement of ocean-bottom materials ranging from 1.0 to 2.0 g/cc. The measurement is based on scattering of gamma rays from a radiation source contained in the device, which is lowered on a cable into unconsolidated sediments. A 137Cs source, with a strength of 100 mC, is screwed into the end of the traveling shield. The gamma intensity is measured by a detector assembly consisting of 30 G-M tubes, a high-voltage power supply, pulse discriminator module, pulse shaper module, and two stages of binary division. Data is photographically recorded by a camera in the instrument while the sensing probe is moved stepwise upward from solid bottom through a range of 11 ft of sediments. A picture is taken of the target data at each of the measuring stations at 2 ft increments of travel in an upward direction. The device is 26 ft long and is powered by self-contained batteries. (For details see TID-4100.) Includes 214 drawings. (AEC Abstract)

HW-SA-3385 Field 8H
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
A STREAM DRIFT SAMPLER,
by C. E. Cushing, Jr. 28 Feb 64, 7p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Samplers, Hydrology), (*Hydrology, Samplers).

LA-3243 Field 8G, 11F, 13I
CFSTI Prices: HC$2.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
ROCK MELTING AS A DRILLING TECHNIQUE,
by Dale E. Armstrong, James S. Coleman, and B. B. McInteer. Mar 62, 36p
Contract W-7405-eng-36
Unclassified report

Descriptors: (*Rock(Geology), Drills), (*Drills, Heat-resistant metals + alloys).

PB-167 531 Field 8B
CFSTI Prices: HC$1.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.
THE CARTOGRAPHIC MANUSCRIPT FOR THE REVISION OF MAPS,
by G. K. Emminizer, Jr. 1962, 21p
Unclassified report

International Cartographic Association Technical Conference (1st), September 10-15, 1962, Frankfurt/Main, Germany.

Descriptors: (*Mapping, Instruction manuals), Maps, Construction, Reproduction.

The cartographic manuscript is a combination of a vast amount of source material including basic surveys, maps, photographs, sketches, and reports, etc., into a uniform, consistent legible base. The subject of this paper relates to the Cartographic Manuscript in the revision of maps and charts.

PB-167 538 Field 8B, 14E
CFSTI Prices: HC$2.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.
RECENT DEVELOPMENTS IN ADJUSTMENT TECHNIQUES IN AERIAL PHOTOGRAMMETRIC MAPPING WITH MINIMUM GROUND CONTROL,
by H. Arnold Karo. 1958, 27p
Unclassified report

Rept. presented at the United Nations Regional Cartographic Conference for Asia and the Far East (2nd), Tokyo, Japan, 20 Oct-1 Nov 58, in support of Agenda Item 10, Topographic Mapping, (a) Application of Photogrammetric Methods in Map Making.
Available copy will not permit fully legible reproduction.

Descriptors: (*Aerial photography, Photogrammetry), (*Photogrammetry, Aerial photography), Aerial photographs, Correlation techniques, Stereoscopic map plotters, Position finding.

Instrumental and computational details are shown which facilitate aerotriangulation, or the utilization of a minimum number of ground control points in a strip of aerial photographs. The methods not only reduce the number of hours of labor required both in the office and in the field, but also the results are more accurate than formerly, few control points are needed, and the specific location of the control is less critical. The methods may be particularly useful in hitherto unmapped and remote areas as well as in large-scale cadastral surveys. (Author)

PB-167 539 Field 8E
CFSTI Prices: HC$1.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.

SOME RECENT DEVELOPMENTS IN GEOMAGNETISM AND GRAVIMETRY,
by H. Arnold Karo. 1958, 8p
Unclassified report

Rept. presented at the United Nations Regional Cartographic Conference for Asia and the Far East (2nd), Tokyo, Japan, 20 Oct-1 Nov 58, in support of Agenda Item 8, Geodesy, (i) New Methods and Techniques in Geodetic Surveying, including Gravimetry and Geomagnetism.
Available copy will not permit fully legible reproduction.

Descriptors: (*Geodesics, Reviews), (*Terrestrial magnetism, Geodesics), (*Gravity, Geodesics), Geophysics, Instrumentation.

New methods and techniques in geodetic surveying, including gravimetry and geomagnetism are discussed. The paper is confined chiefly to developments with which the Coast and Geodetic Survey has been closely identified, rather than world-wide advances in geomagnetism and gravimetry.

PB-167 673 Field 8J
CFSTI Prices: HC$2.00 MF$0.50

Texas A. and M. Univ., College Station. Dept. of Oceanography and Meteorology.
CALCIUM CARBONATE SATURATION LEVEL OF THE OCEAN FROM LATITUDES OF 50S TO ANTARCTICA AND OTHER CHEMICAL OCEANOGRAPHIC STUDIES DURING CRUISE VI AND VII OF THE USNS ELTANIN BETWEEN VALPARAISO, CHILE TO ANTARCTIC ICE SHELF, FROM NOVEMBER 26, 1962 TO FEBRUARY 16, 1963.
Data rept.,
by Donald W. Hood and David Berkshire.
Mar 65, 46p Ref-65-7T
Grant NSF G18477, Proj. 295
Unclassified report

Descriptors: (*Calcium compounds, Carbonates), (*Carbonates, Oceans), (*Oceanology, Calcium compounds), Oceanographic data, Polar regions, Carbon dioxide, South America, Chemical analysis, Zinc, Copper, Manganese.

The primary objective was the study of the extent of calcium carbonate saturation, with depth, of the oceans from the southern tip of South America southward into Antarctic water; the measurement on a continuous basis on the molecular carbon dioxide content of surface water and the atmosphere in this same region, and the collection of samples for trace metal analysis with particular reference to copper, manganese, and zinc.

PB-167 743 Field 8K, 8J
CFSTI Prices: HC$2.00 MF$0.50

Hawaii Inst. of Geophysics, Honolulu.
A STUDY OF THE NORTHWESTERN PACIFIC UPPER MANTLE.
Technical rept.,
by Danial A. Walker. Dec 64, 33p
Rept. no. HIG-64-21
Grant NSF GP3473
Unclassified report

Descriptors: (*Marine geology, Pacific Ocean), (*Seismology, Pacific Ocean), Marine geophysics, Structural geology, Seismic waves, Lithosphere, Velocity, Measurement, Hydrophones.

A fundamental problem of earthquake seismology is the occurrence of the upper mantle low-velocity channel. This study is intended to confirm or deny its existence in the upper mantle below the Northwestern Pacific on the basis of body-wave arrivals at a bottom-mounted hydrophone near Wake Island. A comparison of the observed travel times and the Jeffreys-Bullen travel times shows an extreme anomaly in the 21- to 33-degree range for both P and S waves. Assumed linear paths suggest a P wave channel upper boundary between 165 km and 185 km, and a lower boundary between 290 km and 542 kilometers. Travel times for P and S waves indicate that the velocities in the channel remain constant at 8.1 km/sec and 4.65 km/sec respectively. (Author)

PB-167 827 Field 8J, 8A, 8C
CFSTI Prices: HC$4.00 MF$1.00

Hopkins Marine Station, Stanford Univ., Pacific Grove, Calif.
HYDROGRAPHIC DATA FROM THE AREA OF THE MONTEREY SUBMARINE CANYON, 1951-1955.
Final rept.,
by Rolf L. Bolin. 30 Jul 64, 120p
Contract N6onr25127; Grant NSF G911
AD 462 726
Unclassified report

Descriptors: (*Hydrographic surveying, Pacific Ocean), (*Oceanology, Pacific Ocean), Ecology, Aquatic animals, Marine biology, Oceanographic data, Correlation techniques, Tables, Graphics, California, Seacoast.

In an attempt to establish correlations between variations in the abundance of certain marine organisms and fluctuations in hydrographic variables, a program was initiated late in 1950 that involved periodic sampling of water and plankton from the surface to depths of 1000 meters. The physico-chemical variables of temperature, salinity, oxygen, silicate and phosphate were determined at intervals from the surface to a depth of 1000 meters for the first two years of the program, and to 900 meters subsequently when the loss of some of the hydrographic wire necessitated limiting the depth of the casts. This report presents the hydrographic data.

SB-416 Suppl. 1 Field 8B, 8E

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
PHOTOGRAMMETRY.
Price list, selective bibliography of Government research repts. and translations for Jun 60-Mar 65.
Mar 65, 15p Unclassified report

Available free from the Clearinghouse. Also supplement to CTR-335, Photogrammetry 1937-1958, dated Jan 58.

Descriptors: (*Photogrammetry, Bibliographies), Reports, Costs, Geodesics, Mapping, Instrumentation.

Lists 180 domestic and foreign references on photogrammetry added to the CFSTI collection during the period June 1960 through March 1965. Includes research on geodetic and panoramic photogrammetry; aerial photogrammetric triangulation; stereophotogrammetry applied to hydraulic analogue studies of gas flow, ground surveying, etc.; photogrammetric methods of terrain analysis for determination of aircraft landing cites and topography of liquids; calibration for photogrammetric plotting and recording instrumentation; measurement of the velocity of glacial streams and photographic interpretation of ice, vegetation, clouds and rockets by photogrammetric methods; and photogrammetric data reduction analysis.

09. Electronics and Electrical Engineering

HW-80246 Field 9B
CFSTI Prices: HC$3.00 MF$0.75

Hanford Atomic Products Operation, Richland, Wash.
MIDAS -- A SIMPLIFIED METHOD FOR PROGRAMMING A 7090 COMPUTER FOR SIMULATION OF DYNAMIC SYSTEMS,
by R. D. Benham. 6 Feb 64, 73p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Programming(Computers), Simulation).

N65-16313 Field 9A
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
ANALYSIS OF NOTCH NETWORKS CONTAINING SYNCHRONOUSLY COMMUTATED CAPACITORS OR RC COMBINATIONS,
by Bernard A. Asner, Jr. Feb 65, 74p
NASA-TN-D-2625
Unclassified report

Descriptors: (*Networks, Mathematical analysis), (*Capacitors, Coupling circuits), Differential equations.

Patent 3,177,421 Field 9A

RECTIFIED ALTERNATING-CURRENT CONVERTER.
Patent assigned to Commerce,
by George Franklin Montgomery. 6 Apr 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Half-wave rectifiers, Circuits), Voltage, Electric filters, Alternating current, Direct current, Inductance.

A half-wave and a voltage multiplying rectifier circuit is provided in which the full smoothing and regulating advantages of a filter inductor are realized. This is accomplished in a half-wave rectifier circuit by applying the rectified output of an alternating voltage source to a filter circuit, that includes an inductor, in such a manner that current flows through the inductor during each half-cycle of the alternating voltage. Current flow through the rectifier, that supplies current to the inductor, is permitted during one half-cycle and is blocked during the other half-cycle of the alternating voltage.

Patent 3,182,745 Field 9A

FREE PISTON FLUID PRESSURE TRANSDUCER.
Patent assigned to Navy,
by Chester A. Clark. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Transducers, Underwater sound equipment), Fluid flow, Pressure, Sound, Patents.

The transducer is useful in the field of underwater exploration. It converts the energy of a steady flow of a first fluid medium to sound energy in a second fluid medium. Mechanical vibrations initiate solely within the transducer and the operating frequency corresponds to the natural vibration frequency of the transducer.

Patent 3,183,438 Field 9C

MODULATED POWER MEASURING BRIDGE WITH AUTOMATIC A.C. AND D.C. REBALANCING.
Patent assigned to Army,
by Max M. Hirsch. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Power meters, Radiofrequency power), (*Electric bridges, Power meters), Bolometers, Resistors, Microwave bridges, Servomechanisms, Phase shifters, Amplifiers, Phase detectors, Patents.

The direct reading modulated power meter is specifically arranged for the measurement of radio frequency power. The system includes a basic bolometer bridge composed of bolometers and three fixed resistors. The method is applied in systems using a Golay cell.

Patent 3,183,445 Field 9E, 9A

PHASE COMPARATOR 'AND' GATE.
Patent assigned to Navy,
by David Sigel. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Gates(Circuits), Phase measurement), Diodes(Electron tubes), Triodes, Circuits, Patents.

The comparator circuit compares the phase between two alternating signals and provides an output signal which is proportional to the difference between the phase of the two input signals. The phase comparator circuit utilizes a dual triode and diode. The simulator device compares an azimuth error with a reference voltage.

Patent 3,183,448 Field 9C

DELAY LINE PULSE POSITION MODULATION DEMODULATOR.
Patent assigned to Navy,
by Claude Strother, Jr., and Bennie D. Macomber.
11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Demodulators, Delay lines), Modulation, Pulse modulation, Gates(Circuits), Circuits, Patents.

The method of demodulation increases maximum channel capacity and at the same time simplifies the circuit design by the utilization of passive elements in the circuitry. A linear attenuating delay line is utilized in combination with a gate circuit to convert pulse position modulation to pulse amplitude modulation.

Patent 3,183,457 Field 9E

FERRITE POWER LIMITER DUPLEXER.

Patent assigned to Army,
by John L. Carter and Irving Reingold.
11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Radar duplexers, Ferrites), Waveguides, Limiters, Power, Magnetic fields, Patents.

The duplexer is utilized in a radar system. The microwave duplexer includes a center dual waveguide portion, a first and second ferrite slab associated with the waveguide sections and a direct current magnetic field applied to the center dual waveguide portion in a direction parallel to the broad dimension of the wide walls thereof. The ferrite slabs are equally spaced from the narrow common wall, or from the opposed narrow walls, and extend the same distance longitudinally within their respective waveguide sections.

Patent 3,183,505 Field 9C

ELECTRONIC TIME COMPRESSION SYSTEM.
Patent assigned to Navy,
by Howard J. Strauss. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Display systems, Radar equipment), Cathode ray tubes, Noise(Radar), Patents.

The electronic time compression system basically combines static and dynamic time compression into a single display, such as in a type P indicator for radar systems. The display is provided on a cathode ray tube which indicates in a controlled amount of time at least four successive positions of a target being observed by a radar, and at the end of the fourth position indicator a fading trail display is provided on the screen which indicates the last four previous positions of the target in such a manner that the earliest position fades from the screen first. The disclosed system provides a constant intensity display.

Patent 3,184,161 Field 9B, 19B

LOW ALTITUDE BOMBING HAND COMPUTER.
Patent assigned to Air Force,
by Paul A. Schwarz and Richard L. Krumm.
18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Bombing computers, Low-altitude bombing), Patents, Bombers, Bombing, Analysis of variance.

The low altitude bombing computer is for indicating time at a predetermined speed of a bombing aircraft between an initial identification point for a bombing run and a pull-up bomb release angle. The circular type of computer is designed so that certain known conditions can be entered and then the computer can be adjusted to predetermine the remainder of the variables.

Patent 3,184,604 Field 9E

HIGH-DUTY-CYCLE MULTIVIBRATOR.
Patent assigned to AEC,
by Duane O. Hale. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Relaxation oscillators, Radiation monitors), Cycle rate, Recovery, Transistors, Diodes, Capacitors, Resistors, Circuits, Transformers, Patents.

The monostable multivibrator circuit is of value in nuclear detectors where the intermittent nature of the input signal requires as high a duty factor as possible in order that as few input pulses as possible are rejected. Two PNP transistors, one NPN transistor, a voltage source, a diode, a charging capacitor, a coupling transformer, a plurality of resistances, an input and an output make up the circuit.

Patent 3,184,612 Field 9E, 9A

PULSE-GENERATING COUNTER WITH SUCCESSIVE STAGES COMPRISING BLOCKING OSCILLATOR AND 'AND' GATE FORMING CLOSED AND OPEN LOOPS.
Patent assigned to Army,
by Earl J. Petersen. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Pulse generators, Doppler radar), (*Pulse counters, Doppler radar), Transistors, Gate(Circuits), Synchronization(Electronics), Oscillators, Patents.

The counter is of the transistorized type. It is utilized to synchronize the various operations of a Doppler radar system and permits a very low time jittered synchronizing pulse to be generated. The counter includes five units which are connected in a closed loop and four loops which are connected in an open loop. Each unit includes a blocking or bistable oscillator and an 'and' gate. The units are coupled by capacitors.

Patent 3,184,614 Field 9E, 9A

TUNNEL DIODE COUNTER WITH DOUBLE COUNT CAPACITY PRODUCING STAIRCASE WAVEFORM HAVING BOTH ASCENDING AND DESCENDING STEPS.
Patent assigned to Army,
by Edwin H. Harrison, Jr. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tunnel diodes, Pulse counters), (*Pulse counters, Tunnel diodes), Transistors, Electronic switches, Transients, Circuits, Patents.

The tunnel diode counter is of the type having a plurality of series-connected tunnel diodes. The arrangement is such that after all of the diodes have attained their high voltage states, each additional current pulse causes a successive one of the diodes to return to its low voltage state. A transistor is used in the switch.

Patent 3,184,682 Field 9A

LOW NOISE FREQUENCY CHANGING CIRCUIT.
Patent assigned to Navy,
by Daniel J. Healey III. 18 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Frequency converters, Circuits), Radar receivers, Radio receivers, Noise(Radar), Noise(Radio), Transistors, Capacitors, Resistors, Triodes, Mixers-(Electronic), Patents.

The low noise frequency changing circuit is utilized in radio and radar systems. An improvement is shown in a conventional twin triode frequency changer or mixer circuit. The improved circuit includes an anode load resistor and a capacitor. Transistors are substituted for the tubes in low voltage circuits.

Patent 3,184,688 Field 9E

TEMPERATURE COMPENSATED AMPLIFIER.
Patent assigned to Navy,
by Melvin F. Grahl and Keefer S. Stull, Jr. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Intermediate frequency amplifiers, Thermistors), (*Amplifiers, Stabilization), Temperature, Temperature sensitive elements, Thermistors, Gain, Patents.

The receiver or amplifier system is stabilized against variations in gain due to changes in ambient temperature and heater supply voltage. The stabilizing circuit includes a pair of thermistors connected as a voltage divider across B. positive supply, one thermistor being exposed to ambient temperature and the other being exposed to a heater connected to the tube heater supply voltage.

Patent 3,184,729 Field 9E

SIGNAL DEVIATION DETECTOR.
Patent assigned to Navy,
by David D. Freedman and William J. Hess. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patentiometers, Communication equipment), (*Communication equipment, Potentiometers), Signals, Monitors, Communication theory, Patents.

The signal detector indicates a deviation or change in potential in an electrical signal below a certain predetermined value. The device can be used to determine a rise or drop in potential and to determine when there is no signal on a line. The detector has a flashing warning signal when a potential drop is detected. The device operates any electrical, magnetic, mechanical, optical, or chemical element to indicate an error signal.

Patent 3,184,832 Field 9A

METHOD OF MAKING AN EXPENDABLE ELECTRICAL CONNECTOR.
Patent assigned to Navy,
by James M. Perkins, Paul F. Graf and Frank R. Braun. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Electric connectors, Expansion joints), (*Expansion joints, Electric connectors), Binders, Disconnect fittings, Shear stresses, Guided missiles launchers, Guided missiles, Patents.

The connector electrically joins a missile with a launching structure which may be an aircraft or a fixed launcher. The connector for umbilical connections is made of a pair of connector halves adhesively or otherwise secured together along shear surfaces. Holes drilled through the connector halves are filled with a paste formed of conductive particles and a binder which hardens to a frangible material. Conductors are positioned in the paste prior to hardening. The halves are easily separated by a tensile or shear force. The use of connector pins is eliminated.

Patent 3,185,821 Field 9B

PULSED ANALOG COMPUTER.
Patent assigned to Navy,
by Richard C. Lee, Fred B. Cox and Mark E. Connelly. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Analog computers, Training devices), Analog-digital computers, Computer storage devices, Magnetic materials.

The computer is usable with land based operational flight trainers. Information is represented in the computer in combined analog and digital form. High-speed, time-shared analog computing elements are used. A magnetic drum memory is used to facilitate information storage.

Patent 3,185,865 Field 9A, 9B

TRANSISTORIZED MULTIVIBRATOR WITH BUILT-IN TIME DELAY.
Patent assigned to Navy,
by Bert W. Larey. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Relaxation oscillators, Transistors), (*Delay circuits, Relaxation oscillators), (*Computers, Relaxation oscillators), Patents, Data processing systems, Computer logic.

The transistorized multivibrator is used extensively in computers and data-processing systems. The bistable multivibrator incorporates a 'built-in' time delay in the sense that the multivibrator reaches one of its steady-state conditions prior to the instant at which its remaining steady-state condition is terminated. Two transistors of the PNP type are used in the circuit.

Patent 3,185,866 Field 9E

MAGNETIC FUNCTION GENERATOR.
Patent assigned to Air Force,
by George F. Harpell. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Magnetos, Design), Generators, Patents.

The magnetic function generator is easy and economical to produce and utilizes standard components which lend themselves to mass production manufacturing techniques. The generator structure includes E transformer laminations with a coil wound on each of the three legs. One winding is the output winding, the second is the primary winding and the third is a bucking coil. A synchro motor carries a ring member of permeable material. Rotation of the motor varies the spacing between the ring and E laminations to produce the desired function.

Patent 3,185,928 Field 9A, 9E

PULSE GENERATOR EMPLOYING PLURAL PULSE-FORMING-NETWORKS WITH PULSE PRODUCING MEANS FOR CANCELLATION OF UNDESIRABLE REFLECTED PULSE.
Patent assigned to Army,
by Michael J. Coyle. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Pulse generators, Radar equipment), Thyratrons, Circuits, Magnetrons, Radar pulses, Reflection, Electromagnetic pulses, Patents.

The pulse generating circuit is used in a radar system. It avoids undesirable re-excitation by providing a thyratron tube in one of the pulse forming networks so that the network is terminated in a short circuit at the time the impulse arrives thereto. Due to the action of the thyratron the polarity of the impulse is reversed in the shorted pulse forming network. Thus, the impulses in the two pulse forming networks are of opposite polarity and cancel one another when they are reflected back to the load circuit. Hence there can be no re-excitation of the load.

Patent 3,185,929 Field 9A

SUM AND DIFFERENCE FREQUENCY COMPUTERS FOR AMPLITUDE MODULATORS.
Patent assigned to Air Force,
by Hugh P. Taylor and James C. Davis, Jr.
25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Circuits, Amplitude modulation), (*Modulators, Amplitude modulation), Patents, Voltage, Computers, Capacitors, Diodes(Semiconductors), Limiters, Control.

The device produces a voltage proportional to the sum of two frequencies. The voltage may be used to amplitude modulate a carrier. The circuit includes two rate counters having capacitors and diodes associated therewith, a bucket condenser, a variable resistor and limiter diodes.

Patent 3,185,938 Field 9E

VFO CONTROL FOR GENERATING STABLE DISCRETE FREQUENCIES.
Patent assigned to Navy,
by Louis V. Pelosi. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Oscillators, Radio communication systems), (*Radio communication systems, Oscillators), Frequency, Multiple operation, Discriminators, Aircraft, Ships, Control systems, Patents.

The frequency synthesizer is for use in radio communication systems in which a large number of ships and aircraft are in constant communication. It generates a large multiplicity of output signal frequencies from a single variable frequency oscillator. The spacing between channels may be decreased to a minimum without adversely affecting the quality of the signal frequency generated.

Patent 3,185,945 Field 9A

AMPLIFIED MICROWAVE POWER LIMITER.
Patent assigned to Army,
by William H. Wright, Jr. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Limiters, Microwave equipment), (*Microwave equipment, Limiters), Power, Radar equipment, Waveguides, Waveguide couplers, Patents.

The microwave power limiter is for use in electromagnetic wave transmission systems or radar systems. The device controls the level of power flow in such systems. The power limiter includes first and second highly directive directional couplers, each having four waveguide terminals and a source for supplying electromagnetic energy coupled to one terminal of the first coupler.

Patent 3,188,456 Field 9B, 9A

MAGNETIC MODULATOR FOR COMPUTING DIVISIONS AND MULTIPLICATIONS.
Patent assigned to Navy,
by Raymond L. King, Jr. and Robert L. Conger.
8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Magnetic modulators, Analog computers), Magnetic cores, Spheres, Rings, Configuration, Patents.

The magnetic modulator is for use in computing divisions and multiplications in an analog computer. The device features a core of magnetic material in the shape of a hollow sphere having a large part of the four quadrants thereof removed, thus forming a core configuration of two like rings intersecting each other at right angles at the poles of the sphere.

Patent 3,188,482 Field 9E

STABILIZED SERVO SYSTEM.
Patent assigned to Navy,
by William H. Woodworth and Jack A. Crawford.
8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Transistor amplifers, Servomechanisms), (*Servomechanisms, Stabilization), Patents, Servo amplifiers, Oscillation, Damping, Direct current, Signals, Circuits.

A transistor amplifier circuit for an electrical servo system is disclosed for increasing the efficiency and eliminating the hunting of the system. A D.C. signal is fed back to the emitter of a first stage in a transistor amplifier of the servo system thereby preventing hunting or oscillations.

Patent 3,188,485 Field 9A, 9B

TUNNEL DIODE MEMORY WITH NON-DESTRUCTIVE READOUT.
Patent assigned to Navy,
by James C. Miller and Kam Li. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Tunnel diodes, Computer storage devices), (*Computer storage devices, Tunnel diodes), Patents, Operation, Input-output devices, Digital systems, Voltage, Direct current.

A tunnel diode is used as a memory cell in electronic computer memories. The tunnel diode memory uses one tunnel diode per bit and featuring nondestructive readout. Reading and writing are accomplished by the use of direct current pulses, the readout being capable of detection by an antenna or coil arrangement which senses the output of any bit in the memory plane.

Patent 3,188,491 Field 9A

TRANSMISSION OR BLOCKING GATE.
Patent assigned to Navy,
by Raymond W. La Bahn. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Gates(Circuits), Patents), Signals, Transistors, Resistors, Potentiometers, Capacitors, Diodes(Semiconductor), Switching circuits.

The gating circuit provides rapid control over the passage or blocking of electrical signals with a minimum of interaction between the controlling and gated signals. Components utilized in the circuit include transistors, resistors, potentiometers, capacitors and diodes.

Patent 3,188,493 Field 9A

SHAPING NETWORK FOR FERRITE ATTENUATOR.
Patent assigned to Navy,
by Paul E. Malagari. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Networks, Attenuators), (*Attenuators, Ferromagnetic materials), (*Ferromagnetic materials, Attenuators), (*Waveguides, Attenuators), Patents, Radiofrequency, Attenuation, Control, Transistors, Feedback amplifiers.

The attenuator device is for producing a linear attenuation of R.F. energy within a waveguide. The ferrite attenuator within a waveguide is associated with a control network. The control network consists of a transistor, a feedback amplifier and a shaping network.

Patent 3,188,526 Field 9A

VOLTAGE AND POLARITY SENSING DEVICE.
Patent assigned to Navy,
by Charles E. Engel. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Switching circuits, Electronic switches), Patents, Voltage, Polarization.

A switching circuit is provided where an input voltage causes switches to operate in a certain order depending upon the magnitude and polarity of the input voltage. The switching circuit uses only differing voltage levels and/or polarities for selection intelligence.

Patent 3,188,628 Field 9A, 17I

SYNTHETIC VIDEO GENERATOR.
Patent assigned to Army,
by Earl J. Petersen. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Video networks, Radar receivers), Cathode ray tubes, Video signals, Brightness, Display systems, Gates(Circuits).

The synthetic video generator is used with a radar system of the type wherein a cathode ray tube is utilized to provide a display indicative of the position of a distant object or target. The electronic circuit functions to gate constant amplitude fixed polarity video pulses during intervals of target detection, thus allowing cathode-ray-tube displays to be of constant brightness for both large and small targets.

Patent 3,189,420 Field 9A, 13H

ELECTRICALLY CONDUCTIVE ELEMENT.
Patent assigned to Army,
by Paul R. Gould. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Electrical conductance, Metal films), (*Metal films, Electrical equipment), Manganese alloys, Aluminum alloys, Copper alloys, Silver alloys, Gold alloys, Electrical properties, Soldering, Conductivity, Resistance(Electrical), Adhesion, Vapor plating, Vacuum apparatus, Manufacturing methods.

An electrically conductive thin film is prepared on glass or a similar substrate. The film has excellent adhesion to the substrate and is also solderable using standard techniques with little or no flux. The film also has negligible electrical resistance. A binary alloy is used, one metal of the alloy, manganese or aluminum, adheres strongly to the glass, and the other metal, such as copper, silver or gold, has desirable electrical and soldering properties.

PB-167 414 Field 9B
CFSTI Prices: HC$2.00 MF$0.50

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN AUTOMATIC ROOT LOCUS PLOTTER USING AN ELECTRONIC ANALOG COMPUTER.
Master's thesis,
by Frank Elmer Liethen. Sep 59, 38p
Rept. no. GE-59B-11
AD 227 973

Unclassified report

Descriptors: (*Analog computers, Plotters), (*Plotters, Analog computers), (*Locus, Plotters), Servomechanisms, Feedback, Curve fitting, Functions.

In contrast to present methods of plotting the root locus which are either inaccurate or time consuming, a new method is proposed using an electronic analog computer which is automatic, fast, and accurate. The computer produces a continuous plot of the locus by constructing vectors from the open-loop poles and zeros to the locus point, adding their angles properly, and maintaining this sum equal to the proper multiple of pi as required by the angle condition. The process also calibrates the locus in gain through multiplication of the magnitudes or the reciprocal of the magnitudes of the above vectors. (Author)

PB-167 450 Field 9B, 5B, 14E
CFSTI Prices: HC$1.00 MF$0.50

Low Temperature Research Station, Cambridge (England).
TAPE PUNCHING TYPEWRITER PROCEDURES.
3. PUNCHED TAPE CODE ALPHABETS AND CODE TRANSLATION REQUIREMENTS,
by P. R. P. Claridge. 10 Dec 59, 11p
Rept. no. LTRS-RM-345

Unclassified report

Available copy will not permit fully legible reproduction.
See also PB-167 451.

Descriptors: (*Typewriters, Punched tape), (*Punched tape, Typewriters), Paper, Punched cards.

PB-167 451 Field 9B, 5B, 14E
CFSTI Prices: HC$1.00 MF$0.50

Low Temperature Research Station, Cambridge (England).
TAPE PUNCHING TYPEWRITER PROCEDURES.
1. INTRODUCTION,
by P. R. P. Claridge. 7 Sep 59, 9p
Rept. no. LTRS-RM-335

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Typewriters, Punched tape), (*Punched tape, Typewriters), Paper, Punched cards.

The operations described are in general applicable to any form of tape-punching typewriter provided it has the necessary control circuits. With a tape-punching typewriter information may be typed or punched on tape or in a card. Input may be manual, from the keyboard, or automatic, from a tape or strip-punched card. The information may be in clear or enciphered. Each of these forms must be given a distinctive term to prevent confusion. The machine language, in this case the pattern of punched holes, is referred to as code. Typescript in clear (e.g. English words) is refered to as plain language and enciphered typed symbols as notation. Several notations may be in use at once. Codes are alloted to each of the machine operations (e.g. carriage return) and also for various instruction codes (e.g. to cause the machine to stop reading tape). There are also a number of keys which control operations of the machine (e.g. start read. This is used whenever it is desired to start reading from tape). A brief summary of the effect of the main control keys is included in Table 1. Certain abbreviations are used in recording and describing programmes and procedures and these abbreviations are listed in Table 2. (Extracted)

PB-167 572 Field 9C, 14B
CFSTI Prices: HC$1.00 MF$0.50

Navy Electronics Lab., San Diego, Calif.
ERRORS IN THE USE OF TEST INSTRUMENTS ATTRIBUTABLE TO DESIGN.
Research and development rept.,
by C. R. Bilinski. 21 Nov 57, 9p
Rept. no. NEL-810
AD 205 225

Unclassified report

Descriptors: (*Test equipment(Electronics), Design), Control knobs.

A study was made to determine the type of errors made by electronics maintenance personnel in operating test instruments, and how those errors are related to equipment design. Over 300 men and a representative number of frequently used test instruments were involved. Over 1200 errors were recorded, of which 8 per cent are defined as accidental and 92 per cent due to inadequate training on the part of the operators. The errors resulted largely from improper design of the panels and from nonstandardized design of functional items such as knobs, scales, and levers. (Author)

PB-167 627 Field 9A
CFSTI Prices: HC$5.00 MF$1.00

Melpar, Inc., Falls Church, Va.
THERMOELECTRIC THERMAL-BARRIER MICROELEMENTS.
Final rept. for 1 Apr-30 Sep 62,
by F. K. Eggleston, P. A. Mullin, and N. Fuschillo.
30 Sep 62, 175p
Contract DA36 039sc89212, Task 3A99 15 002 03
AD 409 024

Unclassified report

Descriptors: (*Modules(Electronic), Thermoelectricity), (*Microminiaturization(Electronics), Cooling), Circuits, Electronics, Theory, Heat transfer, Design.

Micromodule thermoelectric cooling devices suitable for direct incorporation into Army micromodules as special microelements having the purpose of protecting heat-sensitive circuit elements were fabricated. These devices, called Thermoelectric Thermal Barrier Microelements (TEB's) would be located between microelement wafers supporting heat-sensitive and heat-generating circuit elements. Selective temperature control, as a new circuit design parameter, holds the promise of increasing the reliability and performance of electronic packaging of the high density required to reduce the space and weight requirements associated with defense electronic systems. The design theory related to Thermoelectric Thermal Barrier (TEB) microelements is developed and all equations used in the design are derived and discussed. The results are presented for Th = 125C and

thermal loads of 50, 100, and 200 mw. These results were obtained by measuring Tc as a function of current. The test data under type I to IV conditions is presented on each of the four batches of 25 units designed to meet type I to IV conditions. Data are presented from more complete tests on six single-junction and six double-junction devices. These include delta T and Tc vs. I curves for various heat loads, maximum temperature difference under zero applied heat load, and temperature difference vs. heat load for various constant currents. (Author)

PB-167 643 Field 9A, 13H
CFSTI Prices: HC$3.00 MF$0.75

Westinghouse Electric Corp., Pittsburgh, Pa.
ORGANIC FILM TUNNELING EFFECTS AND DEVICES.
Final rept. for 1 Nov 62-31 Oct 63,
by T. P. Brody, R. M. Handy, and L. C. Scala.
31 Oct 63, 95p Research rept. no. RR-63-961-900-R4
Contract DA36 039AMC00072, Proj. 1G6 22001A056
AD 435 573

Unclassified report

See also AD-422 434.

Descriptors: (*Semiconductor devices, Tunneling-(Electronics)), (*Semiconducting films, Materials), (*Organic compounds, Semiconducting films), Monomolecular films, Vinyl plastics, Polyester plastics, Stearates, Calcium compounds, Barium compounds, Fatty acids, Tin, Copper, Dielectric films, Amines, Manufacturing methods, Condensation reactions, Copolymerization, Vapor plating, Sandwich construction.

Thin organic insulator films were prepared by an improved Langmuir film technique, by evaporation and by interfacial polycondensation. Barium and calcium stearate, stearic acid, hexacosanoic acid and polyvinyl benzoate (PVB) monolayers were transferred by the Langmuir method, and the electrical properties of these films, sandwiched between evaporated electrodes of various metals, were studied. Monolayers were successfully transferred only onto chemically active substrates, such as Sn or Cu. With these electrodes, the conduction process through mono-and multilayer films is described in terms of a combined tunneling and Schottky-emission mechanism, with an activation energy of 0.25 eV. Gamma-ray irradiation and autoradiographic studies on films of PVB were made. Evidence for radiation-induced cross-linkage was obtained for bulk PVB. It was concluded that the stable 'monolayer' of PVB is composed of 3-4 interlocking layers of molecules. Some interesting memory effects were observed in sandwiches formed with PVB.

PB-167 646 Field 9A, 20L
CFSTI Prices: HC$5.00 MF$1.00

Electronic Materials Research Lab., Univ. of Texas, Austin.
SUPERCONDUCTIVE FREQUENCY CONTROL DEVICES.
Rept. no. 4 (final), 30 Jun 62-1 Sep 63,
by William H. Hartwig. 1 Sep 63, 158p
Rept. no. EMRL-123
Contract DA36 039AMC00036E
AD 433 473

Unclassified report

Descriptors: (*Frequency, Control systems), (*Superconductors, Control systems), Lead alloys, Tin alloys, Electrical impedance, Superconductivity, Inductance, Cryogenics, Impurities, Oscillators, Tuned amplifiers, Quantum mechanics.

Surface impedance theories and experimental results are examined. The quantum mechanical approach gives curves having the right general shape with temperature and frequency. They are inferior to the phenomenological approach in accuracy, however. The quantum approach is most useful at high frequencies. The most attractive theory seems to be the one developed by Dresselhaus and Dresselhaus. Theoretical equations and experimental data are presented for comparison. DC superconductive properties of Lead-Tin alloy foils are presented. Critical temperature remains near 7.2K until lead concentration falls below 20%. In a magnetic field the alloys have type II behavior with higher critical field and broader resistive transitions. Impurities in 100% lead are very critical in determining resistivity since this metal tends to be self-annealing. Circuit configurations discussed include helical resonators, foil wound on quartz, and thin films. Electroplating lead is described.

PB-167 650 Field 9A
CFSTI Prices: HC$7.00 MF$1.75

Vitro Engineering Co., Washington, D. C.
CODING AND IDENTIFICATION OF WIRE AND CABLE, ELECTRICAL IN FSC CLASS 6145.
Final rept.,
by William K. Anders, R. E. Wheeler, Joseph Mazia, and Arthur G. Norris. 31 Jul 58, 340p
Contract DA36 039SC66396, Proj. 6145 0012
AD 205 279

Unclassified report

Standardization study.

Descriptors: (*Electric wire, Identification), (*Electric cables, Identification), Standardization, Government, Electrical industry, Feasibility studies, Specifications.

The objectives of this project were to establish a standard color coding system or other means of identification for electrical wire and cable covered by FSC Class 6145 and to establish a standard method of coding bulk and short lengths of wire at the depot or place of installation. The feasibility study resulted in adoption of a standard which provides for more accurate specification of colors for wire insulation, and the preparation of five identification systems for electrical wire and cable.

PB-167 740 Field 9D, 9B
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J. Digital Systems Lab.
NEAR OPTIMAL SINGLE SYNCHRONIZATION ERROR CORRECTING CODE,
by J. D. Ullman. Mar 65, 25p
Technical rept. no. TR-45

Unclassified report

Descriptors: (*Coding, Errors), (*Synchronization-(Electronics), Errors), (*Digital computers, Synchronization(Electronics)), Optimization, Corrections, Communication theory, Programming(Computers).

A synchronization error is said to occur when either a bit which does not belong is detected in a channel between bits which were transmitted, or a bit which was transmitted is never detected at the output. A block code which corrects a single synchronization error per block is presented, and it is shown that this code has at most three bits more redundancy than that of an optimal code for this class of errors. The code has the beneficial property that it is possible to separate the information positions from the check positions, and an appropriate method of encoding is shown. (Author)

PB-167 754 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
DIGITAL DELAY GENERATOR 218A WITH PLUG-IN UNITS 219B, 219C.
Instrument calibration procedure technical manual.
1 Mar 65, 22p
Contract N123 62861 35056A
NAVWEPS 17-20AG-85

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Pulse generators, Test equipment-(Electronics)), Digital systems, Test methods, Instruction manuals, Synchronization(Electronics).

The manual describes the calibration procedure for the Hewlett-Packard Company 218A Digital Delay Generator with the 219B and 219C Plug-in units. The test instrument will provide sync pulses delayed in time from 1 to 10,000 microseconds with respect to a random trigger.

PB-167 755 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
NOISE FIGURE METER AND VHF NOISE SOURCE 340B, 343A (HEWLETT-PACKARD).
Instrument calibration procedure technical manual.
15 Dec 64, 14p
Contract N123 62861 35056A
NAVWEPS 17-20AG-86

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Noise analyzers, Calibration), Test methods, Instruction manuals, Noise(Radio), Radio receivers, Amplifiers.

The manual describes the calibration procedure for the Hewlett-Packard 340B Noise Figure Meter and the Hewlett-Packard 343A VHF Noise Source. The Test Instrument automatically measures and continuously displays the noise figure of the receiver or amplifier to which it is connected.

PB-167 757 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
POWER METER CALIBRATOR 8402A (HEWLETT-PACKARD).
Instrument calibration procedure technical manual.
1 Feb 65, 14p
Contract N123 62861 35056A
NAVWEPS 17-20AP-08

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Power meters, Test equipment(Electronics)), Test methods, Instruction manuals, Power supplies, Thermistors, Resistance(Electrical).

The manual describes the calibration procedure for the Hewlett-Packard 8402A Power Meter Calibrator. The test instrument is a direct-current power source specifically designed to calibrate the Hewlett-Packard 431A and 431B Power Meters and respective thermistor mounts.

PB-167 759 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
ELECTRICAL POWER TEST SET TS-1261/U.
Instrument calibration procedure technical manual.
15 Dec 64, 16p
Contract N123 62861 35056A
NAVWEPS 17-20AQ-38

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Power meters, Calibration), Voltage, Test methods, Instruction manuals, Ammeters.

The manual describes the calibration of the TS-1261/U, Electrical Power Test Set. The test instrument is designed to measure power factor, voltage, current and power in 3 phase 3 wire systems.

PB-167 761 Field 9C, 9A
CFSTI Prices: HC$1.00 MF$0.50

Raytheon Co., Hawthorne, Calif. Electronic Services Operation.
CARDMATIC TUBE TESTERS AN/USM-118A AND HICKOK MODEL 1234A.
Instrument calibration procedure technical manual.
15 Feb 65, 21p
Contract N123 62861 35058A
NAVWEPS 17-20AY-08

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Electron tubes, Test equipment-(Electronics)), Instruction manuals, Voltage, Test methods.

The manual contains the procedure for the calibration of AN/USM-118A and the Hickok Model 1234A Cardmatic Tube Testers. It is divided into six functional sections to provide segregated information as follows: introduction and description, equipment required, preliminary operations, calibration procedure, test instrument evaluation, calibration checklist and work sheets.

PB-167 765 Field 9C
CFSTI Prices: HC$1.00 MF$0.50

Boeing Co., Seattle, Wash. Aero-Space Div.
Z ANGLE METER 301A, 310B (ACTON LABORATORIES, Inc.).
Instrument calibration procedure technical manual.
1 Jan 65, 15p
Contract N123 62861 35056A
NAVWEPS 17-20AZ-15

Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Electrical impedance, Test equipment-(Electronics)), Meters, Instruction manuals, Test methods, Phase meters, Phase measurement.

The manual describes the calibration procedure for the Acton Laboratories, 310A and 310B Z-Angle Meter which is used to measure impedances from 0.5 to 100,000 ohms and phase angle from 0 to 90 degrees over a frequency range of 30 cps to 40 kc.

PB-167 780 Field 9C, 14B
CFSTI Prices: HC$1.00 MF$0.50

Burroughs Corp., Radnor, Pa.
INSTRUMENT CALIBRATION PROCEDURE AQ-39 METER CALIBRATOR KIN TEL M30B-1Z.
Technical manual.

15 Feb 65, 16p
Contract N123 62861 35057A
NAVWEPS 17-20AQ-39
Unclassified report

Descriptors: (*Test equipment(Electronics), Calibration), (*Calibration, Test equipment(Electronics)), Electrical equipment, Electrical engineering, Test methods, Instruction manuals, Naval research, Meters.

This procedure contains the information necessary for calibrating the M30B-1Z Meter Calibrator, herein referred to as the Test Instrument. The Test Instrument is essentially a high-voltage, high-power standard cell with an output current capability of 10 milliamperes. Direct reading dials provide rapid adjustment of the output voltage over a range of 1.020 to 300 volts. The Test Instrument provides an accurate voltage of known value for laboratory uses, such as calibrating voltmeters.

PB-167 803 Field 9F
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Berkeley. Electronics Research Lab.
FREQUENCY INDEPENDENT ANTENNAS.
Research rept.,
by V. H. Rumsey. 12 Jan 65, 26p
Grant NSF GP2203
Unclassified report

Descriptors: (*Antennas, Theory), Dipole antennas, Log periodic antennas, Spiral antennas, Biconical antennas, Partial differential equations, Field theory.

The basic principles of frequency independent operation are reviewed. The connection between the self-complementary condition for planar structures and the dipole arrays with switched connections is an interesting point. The vital importance of radiation coupling in understanding the application of periodic array theory and the use of dispersion diagrams is stressed. This points to rigorous-field theory as the most promising approach to an adequate understanding of the subject. (Author)

PB-167 860 Field 9E
CFSTI Prices: HC$3.00 MF$0.75

Texas Univ., Austin.
DESIGN STUDY OF A LARGE MILLIMETER WAVE ANTENNA.
Master's thesis,
by Howard Thomas Nerland. Jan 63, 90p
Grant NSF G19979
Unclassified report

Descriptors: (*Antennas, Millimeter waves), Design, Antenna configurations, Attenuation, Water vapor, Graphics, Atmosphere, Antenna components.

Graphs of calculated water vapor attenuation at sea level and 4 kilometers altitude and graphs of total water vapor attenuation through the earth's atmosphere from elevations of sea level and 4 kilometers are shown for frequencies between 10 kMc/s and 1000 kMc/s. Three antenna configurations, lens, interferometer, and reflector are discussed as possible choices for a radio telescope operating between 140 kMc/s and 1000 kMc/s. Two locations for this antenna are proposed and the results of consultations with antenna vendors are included. The equations used in evaluating the water vapor attenuations and the antenna configurations are included in the Appendices. (Author)

10. Energy Conversion (Non-propulsive)

AD-403 129 Field 10C, 7D, 7C
CFSTI Prices: HC$4.00

Monsanto Research Corp., Everett, Mass. Boston Labs.
RESEARCH ON ORGANIC DEPOLARIZERS.
Quarterly progress rept. no. 6, 1 Oct-31 Dec 62,
by Bernard A. Gruber and Elizabeth A. McElhill.
31 Dec 62, 142p Rept. no. MRB4006Q6
Contract DA36 039SC87336, Proj. 3A99 09 002
See also AD-287 221. Unclassified report

Descriptors: (*Primary cells, Additives), (*Nitrobenzenes, Primary cells), Electrochemistry, Electrolytic cells, Halogen compounds, Aromatic compounds, Magnesium, Corrosion inhibition, Sodium compounds, Quinones, Metalorganic compounds.

Half-cell measurements on all depolarizers tested during the contract were tabulated. From these data, depolarizers meeting certain specifications were segregated. No consistent quantitative correlations were found between half-cell characteristics and the electronic strengths of substituents on nitrobenzenes or on other type depolarizers. The magnitude of the electronic effects of substituents on depolarizer activity is discussed. Stable halogen addition compounds of heterohalides and of chlorine were prepared and tested. Inhibition of corrosion of Mg by tetrasodium dinitropyromellitate and other similar soluble nitro compounds was confirmed. A slight increase in reduction efficiency of benzoquinone was realized in benzoquinone o-dinitrobenzene mixes.

AD-405 609 Field 10A, 11I, 7D
CFSTI Price: HC$2.00

Polytechnic Inst. of Brooklyn, N. Y.
ION-EXCHANGE MEMBRANE ELECTROLYTES.
Quarterly progress rept. no. 4, 1 Dec 62-28 Feb 63,
by H. P. Gregor, R. M. Danziger, R. A. Cooper, and G. Brandrup. 28 Feb 63, 31p
Contract DA36 039sc89197, Task 3A99 09 001 02
Unclassified report

Descriptors: (*Fuel cells, Membranes), (*Ion exchange resins, Membranes), (*Membranes, Ion exchange resins), Styrene plastics, Sulfonic acids, Electrolytes, Epoxy plastics, Phenolic plastics, Electroosmosis, Electrolytic cells.

Progress was made in the preparation of low resistance homogeneous membranes, using polystyrenesulfonic acid as the polyelectrolyte, through the use of phenolic and epoxide cross-linking agents. Several mosaic membranes were prepared and are under evaluation. Fuel cell Tafel curves were measured using ion-exchange membranes in the leached state. Electroosmotic water transport measurements were made observing the effect of pressure across the membrane. (Author)

N65-18215 Field 10A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EFFECTS OF IMPURITIES ON RADIATION DAMAGE OF SILICON SOLAR CELLS,
by Joseph Mandelkorn, Lawrence Schwartz, Robert P. Ulman, Jacob D. Broder, and Harold E. Kautz.
Mar 65, 10p NASA-TN-D-2711
Unclassified report

Descriptors: (*Solar cells, Radiation damage), (*Radiation damage, Solar cells).

N65-19916 Field 10A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
LABORATORY EXPERIMENTS ON THE PERFORMANCE OF SILICON SOLAR CELLS AT HIGH SOLAR INTENSITIES AND TEMPERATURES,
by Phillip A. Johnston. Mar 65, 24p
NASA-TN-D-2733

Unclassified report

Descriptors: (*Solar cells, Performance(Engineering)), High-temperature research, Silicon, Semiconductor devices.

Patent 3,182,984 Field 10C, 13J

AMALGAM MIXING VESSEL FOR PRIMARY BATTERY SYSTEM.
Patent assigned to Navy,
by Nathan Gilbert. 11 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Primary cells, Containers), (*Mercury alloys, Sodium alloys), Patents, Alkali metal alloys, Fuel cells, Auxiliary power plants, Submarines.

The primary battery system is for submarine use and is designed to supplement the main power system and supply the power required for the auxiliary equipment. A sodium and amalgam mixing or regeneration vessel is shown for the battery system.

Patent 3,183,122 Field 10A

FUEL CELL.
Patent assigned to Navy,
by Joseph C. White and Sigmund Schuldiner. 11 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Fuel cells, Design), Cathodes, Anodes, Palladium alloys, Nickel alloys, Electrochemistry, Hydrogen, Oxygen, Patents.

The fuel cell structure includes in combination a hollow porous cathode and a hollow porous anode. The anode is formed of a nickel-palladium alloy containing from about 0.1 to 2 percent by weight of palladium. The anode is arranged in the cathode.

PB-167 642 Field 10C
CFSTI Prices: HC$2.00 MF$0.50

Caribbean Trading Corp., Fort Lauderdale, Fla.
LOW TEMPERATURE BATTERY (NEW MAGNESIUM ANODE STRUCTURE).
Semi-annual rept. no. 1, 1 Oct 63-31 Mar 64,
by Rodolfo R. Balaguer. 31 Mar 64, 45p
Rept. no. 3
Contract DA36 039AMC03369E, Proj. 1G6 22001A053, Task 1G6 22001A053 02
AD 442 516

Unclassified report

Continuation of Contract DA36 039AMC00021E.

Descriptors: (*Low-temperature batteries, Dry cells), (*Dry cells, Performance(Engineering)), (*Primary cells, Magnesium), (*Anodes, Magnesium), Life expectancy, Electrolytes, Capacitance, Resistance-(Electrical), Electrodes, Strontium compounds, Battery separators, Magnesium compounds, Bromides, Voltage, Storage, Perchlorates, Chromates, Sodium compounds, Tables.

Investigations of shelf life and low temperature performance of the magnesium Balaguer cell consisted principally of two shelf and three experimental design programs, involving various modifications and combinations of cell components. The use of a plastic bottom closure in place of tinned steel was developed and appears highly promising for improved shelf life. Further electrolyte studies are indicated for the improvement of low temperature performance. (Author)

11. Materials

GEAP-4437 Field 11F
CFSTI Prices: HC$5.00 MF$1.00

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
SODIUM MASS TRANSFER: X. 1963 CORROSION SAMPLE DATA,
comp. by L. E. Pohl. Feb 64, 187p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Corrosion, Sodium), (*Sodium, Transport properties).

GEAP-4504 Field 11F
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
SPECIFIC ZIRCONIUM ALLOY DESIGN PROGRAM. Summary rept.,
by H. N. Klepfer. 19 May 64, 94p EURAEC-1193
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Zirconium alloys, Corrosion), (*Corrosion, Zirconium alloys).

HW-80505 Field 11F
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
COMPARISON OF URANIUM AND ZIRCONIUM EXTRUSION PERFORMANCE WITH CRITICAL ANGLE ULTRASONIC TESTS,
by G. L. Waldkoetter. 7 Feb 64, 24p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Uranium, Ultrasonic radiation), (*Zirconium, Ultrasonic radiation).

HW-83550 Field 11F, 13H, 7A
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.

A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress report, 1 Apr-1 Jul 64.
14 Jul 64, 5p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Technetium, Recovery), (*Tungsten alloys, Mechanical working).

Patent 3,183,118 Field 11E, 7B, 7C

REACTION PRODUCTS OF NICKEL, COPPER AND MERCURY SALTS AND PROCESS FOR RENDERING COTTON FABRIC ROT RESISTANT THEREWITH.
Patent assigned to Agriculture,
by Charles J. Conner. 11 May 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Cotton textiles, Fungusproofing), (*Copper compounds, Borates), (*Zirconium compounds, Acetates), (*Fungusproofing, Cotton textiles), Zirconyl radicals, Nickel compounds, Mercury compounds, Surface-active substances, Chemical reactions, Complex compounds, Salts, Solubility, Water, Carboxylic acids, Patents.

The water soluble reaction products exhibit fungicidal activity and have utility in the art of treating cotton fabrics. Copper borate and other water insoluble salts are made water soluble by mixing with zirconyl acetate in acetic acid solution.

Patent 3,183,149 Field 11E, 7B, 7C

PROCESS FOR MAKING CELLULOSIC TEXTILES ROT RESISTANT WITH ZIRCONIUM SALTS AND PHENOLS.
Patent assigned to Agriculture,
by Elwood J. Gonzales, Clark M. Welch, and John D. Guthrie. 11 May 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Cotton textiles, Fungusproofing), (*Fungusproofing, Cotton textiles), (*Phenols, Zirconium compounds), (*Zirconium compounds, Phenols), Moistureproofing, Surface-active substances, Textiles, Tensile properties, Cellulose, Acetates, Patents.

Increased rot-resistance, breaking strength, and water repellence are imparted to a cellulosic textile material by bonding phenolic compounds to the cellulosic textiles with zirconium salts. The phenols are effective in inhibiting the attack of microorganisms on various substrates.

Patent 3,183,215 Field 11I, 11B, 11D, 7C

CROSS-LINKED POLY(ESTER-ACETALS).
Patent assigned to Agriculture,
by Everett H. Pryde. 11 May 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Glass, Laminates), (*Acetals, Esters), (*Esters, Acetals), (*Bonding, Glass), Polymers, Thermosetting plastics, Plastics, Gels, Catalysts, Patents.

The cross-linked products have utility as bonding agents for glass laminates. Certain novel soluble poly(ester-acetal) resins initially formed under alkaline conditions, under which the acetal groups appear to be inactive, may be crossed-linked by the addition of a non-oxidative catalyst in the thermosetting step, thus activating the acetal groups and forming insoluble, infusible transparent gels.

Patent 3,184,302 Field 11F

PROCESS, REMOVAL OF OXYGEN AND ALUMINUM FROM METALS PREPARED BY ALUMINOTHERMIC AND SIMILAR PROCESSES.
Patent assigned to Interior,
by Carl J. Chindgren. 18 May 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Refractory metals, Purification), (*Refining(Metallurgy), Refractory metals), (*Powder metals, Refining(Metallurgy)), Vanadium, Zirconium, Titanium, Chromium, Molybdenum, Tantalum, Tungsten, Impurities, Oxygen, Aluminum, Calcium, Barium compounds, Peroxides, Patents.

High-purity refractory metals such as vanadium, zirconium, tantalum, and the like are prepared from an impure refractory metal containing impurities such as oxygen and a low percentage of alloyed aluminum. The impure refractory is reacted with barium peroxide, metallic calcium and metallic aluminum. The recovered product contains very small amounts of oxygen and alloyed aluminum.

Patent 3,184,333 Field 11L

WET-STRENGTH PAPER COMPRISING HIGHLY OXIDIZED PERIODATE OXYSTARCH AND PROCESS OF PREPARING THE SAME.
Patent assigned to Agriculture,
by John W. Swanson, Edward J. Jones, and Charles L. Mehltretter. 18 May 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Paper, Impregnation), (*Starches, Paper), Mechanical properties, Additives, Sodium compounds, Borates, Iodates, Oxidation, Patents.

The wet-strength of paper is improved by soaking the paper in the composition and then drying the paper. The impregnant composition contains a fully oxidized dialdehyde starch in an aqueous solution containing a small amount of borax. This solution is heated at about 95 degrees C. for thirty minutes before the paper is soaked.

Patent 3,187,556 Field 11I, 14B, 14C

AUTOMATIC RECORDING VICAT TYPE APPARATUS FOR HEAT DISTORTION AND MELTING POINT DETERMINATIONS.
Patent assigned to Air Force,
by Gerhard F. L. Ehlers. 8 Jun 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Plastics, Thermal properties), (*Test equipment, Plastics), (*Recording systems, Test equipment), Hardness, Melting, Deformation, Thermodynamics, Determination, Temperature, Powders, Solids, Heaters, Cooling, Transducers, Thermocouples, Quality control, Patents.

The Vicat testing apparatus is capable of automatically recording data of the softening and melting characteristics of plastics over a wide range of temperatures. The plastic may be a solid or a powdered material. The apparatus includes heater block, a chamber for the specimen, a guided Vicat needle, a cooling disk, and a transducer and thermocouple arrangement for continuously plotting a curve of specimen temperature and needle movement.

Patent 3,188,169 Field 11F, 18J

SEPARATION OF METAL VALUES BY CATION EXCHANGE FROM CONCENTRATED PERCHLORIC ACID SOLUTION.
Patent assigned to AEC,
by Kurt A. Kraus and Fred Nelson. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Metals, Separation), (*Separation, Ion exchange), (*Perchloric acid, Separation), Ion exchange resins, Solutions, Actinide series, Fission products, Strontium, Yttrium, Thorium, Uranium, Plutonium, Neptunium, Patents.

Mixtures of metal values, including strontium, yttrium, thorium, uranium, plutonium and neptunium, are separated by contacting a concentrated perchloric acid containing the mixture of metal values, together with a minor portion of at least one other mineral acid, with a cation exchange resin whereby the metal values are selectively adsorbed and selectively eluting the adsorbed metal values from the resin. Separation of individual elements or groups of elements is obtained in both the adsorption and desorption steps.

Patent 3,188,223 Field 11C

PROTEIN-POLYMERIC DIALDEHYDE COMPOSITIONS AND PROCESS OF COATING A BASE THEREWITH.
Patent assigned to Agriculture,
by Francis B. Weakley and Charles L. Mehltretter.
8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Organic coatings, Paper), (*Proteins, Aldehydes), Patents, Polymers, Casein, Starches, Oxidation, Acids, Iodine compounds, Moistureproofing.

The composition is for coating paper. The product is a copolymer of a protein, such as casein and soybean protein, and a highly polymeric dialdehyde. The dialdehyde is produced by essentially complete periodic acid oxidation of starch.

Patent 3,188,231 Field 11B, 18J

PROCESS OF MAKING CRUCIBLES.
Patent assigned to AEC,
by Zbigniew D. Jastrzebski. 8 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D. C., 20231, $0.25

Descriptors: (*Crucibles, Refractory materials), (*Beryllium compounds, Oxides), Patents, Refractory coatings, Calcium compounds, Aluminates, Aluminum compounds, Magnesium compounds, Density, Molding, Heat treatment.

The crucibles are used for containers of materials such as neutron-irradiated nuclear fuel. The crucible is made of a fired mixture consisting of 85 to 92 percent by weight of beryllium oxide and from 8 to 15 percent of calcium aluminate coated with a fired layer of a mixture consisting of alumina, magnesium oxide and an oxide such as beryllium oxide and calcium oxide.

Patent 3,189,543 Field 11H

GREASE YIELDS.
Patent assigned to California Research Corp.,
San Francisco, Calif.,
by Dean W. Criddle. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricants, Preparation), (*Greases, Preparation), (*Calcium compounds, Greases), (*Glycols, Lubricant additives), Stearates, Acetates, Carbonates, Hydroxides, Soaps, Polymers, Heat-resistant materials, Patents.

The invention is directed to lubricating grease compositions, more particularly to the use of certain agents to improve the yield of calcium base greases. The yields of grease compositions are increased by incorporating therein an oil-soluble polyglycol polymer, which grease composition contains a calcium soap of 12-hydroxy stearic acid (or its equivalent), calcium acetate in amount of from 2 mols to 5 mols for each mol of said calcium soap of 12-hydroxy stearic acid, excess base expressed as calcium hydroxide, and calcium carbonate in amounts sufficient to impart improved consistency to said grease composition, which calcium carbonate is obtained by reacting urea with calcium hydroxide. The grease compositions are water-resistant, have high film strength, have improved work stability, and have excellent high temperature characteristics.

Patent 3,189,545 Field 11H

LUBRICATING COMPOSITION.
Patent assigned to Standard Oil Co., Chicago, Ill.
by Randel Q. Little, Jr., and Sigmund S. Deluga.
15 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Lubricants, Phosphites), (*Phosphites, Lubricants), Silver, Copper, Lubrication, Wear resistance, Corrosion inhibition, Antioxidants, Sulfur compounds, Alcohols, Terpenes, Spiro compounds, Patents.

Didecyl pentaerythritol diphosphite, or similar dialkyl pentaerthritol diphosphites having 7 to 20 carbon atoms in the dialkyl radical, improves lubricity and inhibits corrosion in electrical generating and railway diesel engine lubricating oils. The additive retards the corrosion of copper and silver plated bearings, wrist pins, and other internal parts by the elemental sulfur of

decomposed anti-oxidant compounds, and reduces silver-on-steel wear and seizure. The lubricating composition consists of from 20 to 50 percent by weight of a sulfurized terpene, olefin polymer, or petroleum wax anti-oxidant and detergent, from 0.10 to 5 percent of the diphosphite inhibitor, and an SAE grade 40 mineral oil base having a viscosity index of 63.

Patent 3,189,547 Field 11H

LUBRICATING COMPOSITIONS.
Patent assigned to Shell Oil Co.,
by George M. Calhoun. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricant additives, Esters), (*Organic sulfur compounds, Lubricant additives), (*Stearates, Lubricants), Heat-resistant materials, Pressure, Mineral oils, Fatty acids, Ethers, Glycols, Polymers, Patents.

An oil-soluble dicarboxy C 1-4 alkyl mercapto stearate diester of polyethylene glycol is employed as an extreme pressure agent in mineral lubricating oils. A mineral lubricating oil containing the pressure agent is useful for lubricating gears and bearings under high pressure and load conditions. From 0.5 to 20 percent by weight of the oil-soluble additive is incorporated into a mineral lubricating oil.

Patent 3,189,549 Field 11H

SYNTHETIC LUBRICANTS OBTAINED BY THE TELOMERIZATION OF UNSATURATED HYDROCARBONS WITH POLYOXYALKYLENE COMPOUNDS.
Patent assigned to Standard Oil Co., Cleveland, Ohio,
by Donald D. Emrick, Samuel M. Darling, and Edwin O. Hook. 15 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lubricants, Synthesis(Chemistry)), Alkenes, Ethers, Polymers, Glycols, Patents.

Free-flowing liquid telomers are used as synthetic lubricants or with mineral lubricating oils in internal combustion engines. The liquid telomers have a high oxygen content since they can be pyrolyzed with little carbon residue, and they have a high solvent capacity for the resins, gums, sludges and varnishes which are formed in internal combustion engines. The telomer is prepared by the telomerization of olefins such as ethylene with polyoxyalkylene compounds in the presence of a free radical initiator.

PB-167 633 Field 11G, 9A, 7D
CFSTI Prices: HC$2.00 MF$0.50

General Telephone and Electronics Labs., Inc.,
Bayside, N. Y.
STUDY OF THIN FILM COMPOUNDS FORMED FROM SIMULTANEOUSLY EVAPORATED CONSTITUENTS.
Quarterly rept. no. 2, 1 Sep-30 Nov 63,
by A. K. Hagenlocher and A. E. Feuersanger.
30 Dec 63, 31p Rept. no. TR-63-206.2
Contract DA36 039AMC00105E, Proj. 1G024401A112
AD 433 638 Unclassified report
Continuation of Contract DA36 039SC87302.

Descriptors: (*Capacitors, Materials), (*Dielectric films, Vapor plating), (*Lead compounds, Titanates), (*Titanates, Vapor plating), Barium compounds, Evaporation, Titanium compounds, Oxides, Resistance-(Electrical), Impurities, Capacitance, X-ray diffraction analysis, Electron microscopy.

Thin films of lead titanate have a number of advantages over barium titanate. Details of the preparation of lead titanate films by the simultaneous evaporation of lead and titanium oxides, initial attempts to increase the electrical resistance by the incorporation of small amounts of metal oxides, and preliminary experiments with insulator substrates are described. The capacitance, dissipation factor and leakage resistance of lead titanate films are comparable to those found for barium titanate. The frequency dependence of the capacitance and losses follows closely a relation given by Gevers for dielectrics of irregular structure. Strong x-ray diffraction patterns of tetragonal PbTiO3 have been obtained for films 1500 to 2500 A thick. Electron micrographs of the film surface show a uniform texture of grains of sizes between 1000 and 3000 A. (Author)

PB-167 707 Field 11F, 20K
CFSTI Prices: HC$2.00 MF$0.50

Frankford Arsenal, Philadelphia, Pa. Research and Development Directorate.
FRACTURE CHARACTERISTICS OF SEVERAL HIGH STRENGTH ALUMINUM ALLOYS USING VARIABLE NOTCH ROOT RADII,
by Joseph H. Mulherin. Sep 64, 44p
Rept. no. R-1734
Proj. 1A2440A110 Unclassified report
AD 452 318

Descriptors: (*Aluminum alloys, Fracture(Mechanics)), (*Fracture(Mechanics), Aluminum alloys), Stresses, Toughness, Sheets, Test methods, Experimental data, Elasticity, Strain(Mechanics), Steel, Mechanical properties.

A relationship between the stress concentration factor and the fracture toughness parameter was examined for the case of an elliptical hold in an infinite solid. Edge-notched specimens from three high-strength aluminum alloys were tensile loaded to failure. The resulting data from these tests were analyzed, using this relationship. It was indicated that the predicted proportionality between the fracture toughness parameter and the square root of the notch root radius does exist. Further examination of the relationship showed that the fracture occurs at a fixed state of strain within a plastic zone having a size proportional to the original root radius. A departure, however, from the predicted behavior was evident with the introduction of plane strain components at the notch root. This is also discussed. (Author)

SB-440 Suppl. 1 Field 11E, 15E

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
QUARTERMASTER CORPS TEXTILE SERIES REPORTS.
Price list, selective bibliography of government research repts. and translations for Dec 60-Nov 64.
Apr 65, 7p Unclassified report
Available free from the Clearinghouse.

Descriptors: (*Bibliographies, Textiles), (*Textiles, Army equipment), Fire-resistant textiles, Woolen textiles, Fibers(Synthetic), Wear resistance, Moistureproofing, Tents, Logistics, Military requirements.

Lists 15 references in the Quartermaster Corps Textile series added to the CFSTI collection during the period December 1960 through November 1964. Includes research on quarpel, fire-resistant textiles, wool-type fabrics, synthetic fibers, blend fabrics, wear resistance and moisture proofing of military textiles, textiles for tents, color standards and fabric requirements.

SB-479 Suppl. 1 Field 11I, 11D, 11E, 11B

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
FIBER GLASS AND GLASS LAMINATES.
Price list, selective bibliography of government research repts. and translations for Oct 61-Apr 65.
Apr 65, 21p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Bibliographies, Laminates), (*Glass textiles, Laminates), (*Glass laminates, Bibliographies), Composite materials, Filament would construction, Reinforcing materials, Honeycomb cores, Fibers-(Synthetic), Plastic laminates.

Lists 315 references on fiber glass and glass laminates added to the CFSTI collection from October 1961 through April 1965. Includes research on filament would fiber glass; glass-metal composite materials; high strength and high temperature properties of glass fibers; glass fiber reinforced honeycomb core; adhesive fiber glass cloth; glass fibers used as reinforcement for prestressing concrete and for plastic materials; protective clothing made of aluminum-coated glass textiles; fiber glass boat building; erosion resistance of glass reinforced plastic materials; glass reinforced plastics for hydrospace applications; and fiber glass building materials.

12. Mathematical Sciences

AD-249 662 Field 12B
CFSTI Prices: HC$3.00

Operations Research Office, Johns Hopkins Univ., Bethesda, Md.
A PROCEDURE FOR DETERMINING A FAMILY OF MINIMUM-COST NETWORK FLOW PATTERNS,
by Robert G. Busacker and Paul J. Gowen.
Nov 60, 57p Technical paper ORO-TP-15
Unclassified report

Descriptors: (*Networks, Linear programming), (*Linear programming, Networks), Statistical networks, Iterative methods, Mathematical programming, Transportation, Traffic.

A procedure is presented for solving the following problem: Given a finite network with a capacity and a length (or cost factor) associated with each orientation of every link, find a family of minimum-cost flow patterns between two specified nodes, one pattern for every integral amount of flow up to the maximum consistent with link capacities. The procedure is an iterative process that adds a succession of appropriate elementary chain flows in such a way that each new pattern minimizes cost for a greater amount of flow. The presentation is intended to be self-contained and includes a proof of the validity of the procedure. (Author)

AD-434 244 Field 12A
CFSTI Prices: HC$3.00

Brown Univ., Providence, R. I. Div. of Applied Mathematics.
TOEPLITZ OPERATORS ON LOCALLY COMPACT ABELIAN GROUPS,
by Henry Alan Krieger. Mar 64, 60p
Grant NSF E791
Unclassified report

Descriptors: (*Operators(Mathematics), Groups-(Mathematics)), (*Groups(Mathematics), Operators-(Mathematics)), Integral transforms, Algebraic topology, Distribution theory, Matrix algebra.

N65-18608 Field 12A, 20C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
EXPANSION OF THE FOKKER-PLANCK EQUATION IN SPHERICAL HARMONICS,
by Frederic A. Lyman. Mar 65, 34p
NASA-TN-D-2716
Unclassified report

Descriptors: (*Special functions(Mathematical), Partial differential equations), (*Partial differential equations, Special functions(Mathematical)), Integral equations.

PB-167 655 Field 12B, 5C, 15G, 5K
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE COMPRESSIBILITY OF ORGANIZATIONS AND ECONOMIC SYSTEMS,
by Oskar Morgenstern. 17 Aug 54, 22p
Rept. no. RM-1325 Unclassified report
AD 85 984
Rept. on Proj. RAND.

Descriptors: (*Operations research, Systems engineering), (*Systems engineering, Operations research), Economics, Theory, Military organizations, Mathematical models, Game theory.

This paper investigates the problem of distinguishing essential and non-essential activities within an economic system (or more generally an organization), in the sense that the system will continue to operate at least in a rudimentary fashion if the non-essential activities cease, but will collapse unless all the essential activities are performed. (Author)

PB-167 696 Field 12A, 18K
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
A CLASS OF NONLINEAR DELAY DIFFERENTIAL EQUATIONS,
by John A. Nohel. Jan 59, 30p
Technical summary rept. no. MRC-TSR-69
Contract DA11 022ORD2059
AD 211 067
Unclassified report

Descriptors: (*Nonlinear differential equations, Reactor theory), (*Circulating fuel reactors, Stability), Reactor kinetics.

PB-167 697 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.

A THEOREM ON INTEGRAL TRANSFORMS WITH AN APPLICATION TO PREDICTION THEORY,
by J. Chover. Jan 59, 14p
Technical summary rept. no. MRC-TSR-65
Contract DA11 022ORD2059
AD 212 053

Unclassified report

Descriptors: (*Integral transforms, Mathematical prediction), (*Mathematical prediction, Integral transforms), Functional analysis, Stochastic processes.

PB-167 698 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON WEAK CONVERGENCE IN THE SPACE OF FUNCTIONS OF BOUNDED VARIATION, II,
by Pasquale Porcelli. Jan 59, 14p
Technical summary rept. no. MRC-TSR-68
Contract DA11 022ORD2059
AD 212 054

Unclassified report

Descriptors: (*Functional analysis, Calculus of variations), (*Sequences, Functional analysis), Integrals, Algebra.

PB-167 699 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
LIMIT PROPERTIES AT ZERO OF THE MARKOV SEMI-GROUP,
by Rafael V. Chacon. Feb 59, 12p
Technical summary rept. no. MRC-TSR-74
Contract DA11 022ORD2059
AD 213 459

Unclassified report

Descriptors: (*Groups(Mathematics), Measure theory), Probability, Statistical processes.

PB-167 700 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
MEROMORPHIC FUNCTIONS WITH MAXIMUM DEFECT SUM,
by S. M. Shah and S. K. Singh. Feb 59, 9p
Technical summary rept. no. MRC-TSR-75
Contract DA11 022ORD2059
AD 213 460

Unclassified report

Descriptors: (*Functions, Theorems), Series, Numerical analysis.

PB-167 702 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
AUTOMATIC ALGEBRAIC REDUCTIONS FOR THE THIRD-ORDER AUTOREGRESSIVE PROCESS,
by Bruce A. Holum and Enders A. Robinson.
Feb 59, 8p Technical summary rept. no. MRC-TSR-76
Contract DA11 022ORD2059
AD 213 462 Unclassified report

Descriptors: (*Statistical processes, Algebra), (*Algebra, Statistical processes), Time, Series, Analysis of variance.

PB-167 711 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON SYSTEMS OF LINEAR DIFFERENTIO-STIELTJES-INTEGRAL EQUATIONS,
by T. H. Hildebrandt. Dec 58, 37p
Technical summary rept. no. MRC-TSR-64
Contract DA11 022ORD2059
AD 210 915

Unclassified report

Descriptors: (*Integral equations, Theory), Matrix algebra, Functions, Boundary value problems.

PB-167 715 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
OPERATIONAL METHODS IN NUMERICAL ANALYSIS BASED ON RATIONAL APPROXIMATIONS,
by Zdenek Kopal. 4 Dec 57, 32p
Technical summary rept. MRC-TSR-14
Contract DA11 022ORD2059
AD 160 675

Unclassified report

Descriptors: (*Numerical analysis, Operators-(Mathematics)), (*Operators(Mathematics), Numerical analysis), Functions, Integration, Taylor's series, Differential equations.

The aim of the communication was to develop new methods for numerical integration and differentiation of continuous functions in terms of their tabular differences, by a linear process susceptible of remarkable accuracy without recourse to finite differences of high orders. In order to establish it, the infinitesimal operations of (k-tuple) integration or differentiation will be rewritten in terms of finite-shift operators, and replaced by rational-fraction approximations converging rapidly to the exact result. In order to linearize the operations so indicated, fractions are subsequently cleared by multiplication. Systematic rational approximation to the integral operator expressed in terms of diagonal and central differences are developed, and adapted to use for numerical integration of ordinary differential equations. Reasons are listed suggesting that the adoption of our process is likely to cut the time and work involved in automatic construction of such solutions by large factors. (Author)

PB-167 717 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SOLUTION OF NONLINEAR DIFFERENTIAL EQUATIONS WITH A PARAMETER BY ASYMPTOTIC SERIES,
by Wolfgang Wasow. Feb 58, 45p
Technical summary rept. MRC-TSR-21
Contract DA11 022ORD2059
AD 161 978

Unclassified report

Descriptors: (*Nonlinear differential equations, Series), (*Series, Nonlinear differential equations), Power series, Matrix algebra.

PB-167 726 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
A REPRESENTATION THEOREM FOR OPERATOR-VALUED RADON MEASURES,
by Richard Dowds. Aug 58, 25p
Technical summary rept. MRC-TSR-35
Contract DA11 022ORD2059 Unclassified report
AD 203 843

Descriptors: (*Measure theory, Conformal mapping), (*Conformal mapping, Measure theory), Functional analysis, Topology, Theorems.

PB-167 727 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ASYMPTOTIC THEORIES FOR LINEAR ORDINARY DIFFERENTIAL EQUATIONS DEPENDING UPON A PARAMETER,
by Rudolph E. Langer. Nov 58, 17p
Technical summary rept. MRC-TSR-60
Contract DA11 022ORD2059
AD 207 993
Unclassified report

Descriptors: (*Differential equations, Theory), Series.

PB-167 744 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
NOTE ON THE COMPLETENESS OF HERMITE FUNCTIONS,
by Jurgen Moser and Pasquale Porcelli.
Sep 59, 5p Technical summary rept. MRC-TSR-107
Contract DA11 022ORD2059
AD 228 716
Unclassified report

Descriptors: (*Special functions(Mathematical), Theory), Polynomials, Algebra, Integrals.

A proof is given of the completeness of the Hermite polynomials in the Hilbert space that goes through verbatim to the k-dimensional case.

PB-167 745 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON EXCEPTIONAL VALUES AND THE GENUS OF A MEROMORPHIC FUNCTION (II),
by S. M. Shah. Oct 59, 10p
Technical summary rept. MRC-TSR-115
Contract DA11 022ORD2059
AD 228 719
Unclassified report

Descriptors: (*Functions, Complex variables), (*Complex variables, Functions), Theory.

PB-167 746 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
A RANK SUM TEST FOR COMPARING ALL PAIRS OF TREATMENTS,
by Robert G. D. Steel. Sep 59, 26p
Technical summary rept. MRC-TSR-108
Contract DA11 022ORD2059
AD 228 717
Unclassified report

Descriptors: (*Statistical tests, Analysis of variance), Probability, Permutations, Matrix algebra, Population(Mathematics).

A multiple comparison rank sum test, for the simultaneous comparison of all pairs of treatments in a one-way classification with equal numbers of observations, is presented. An example is worked and tables of critical values are given. Computation of probabilities for the general case of unequal numbers of observations is considered and means, variances, and covariances are given for this case. (Author)

PB-167 748 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Mathematics Research Center, Univ. of Wisconsin, Madison.
QUADRATURE IN TERMS OF EQUALLY-SPACED FUNCTION VALUES,
by J. C. P. Miller. Jul 60, 94p
Technical summary rept. MRC-TSR-167
Contract DA11 022ORD2059
AD 254 722
Unclassified report

Descriptors: (*Integration, Numerical methods and procedures), Polynomials, Functions, Differential equations, Tables.

PB-167 771 Field 12A
CFSTI Prices: HC$2.00 MF$0.50

Harvard Univ., Cambridge, Mass.
A GENERALIZATION OF BRAUER CHARACTERS,
by W. F. Reynolds. Jul 64, 35p
Grant NSF G23833
Unclassified report

Prepared in cooperation with Tufts Univ., Medford, Mass.

Descriptors: (*Groups (Mathematics), Algebra), Functions, Matrix algebra.

PB-167 799 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
TIMELIKE INITIAL VALUE PROBLEMS FOR HYPERBOLIC EQUATIONS: II,
by J. M. Zimmerman. Jun 62, 14p
Rept. no. IMM-NYU-296
Grant NSF G14520
Unclassified report

Descriptors: (*Differential equations, Inequalities), (*Boundary value problems, Fourier analysis), Partial differential equations, Nonlinear differential equations.

PB-167 800 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.

A CLASS OF IMPROPER BOUNDARY VALUE PROBLEMS WITH 'DAMPED' CAUCHY DATA,
by J. M. Zimmerman. Jul 62, 27p
Rept. no. IMM-NYU-299
Grant NSF G14520

Unclassified report

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), Fourier analysis, Inequalities, Integral equations.

PB-167 814 Field 12A
CFSTI Prices: HC$3.00 MF$0.75

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ON SOME REGULAR MULTIPLE INTEGRAL PROBLEMS IN THE CALCULUS OF VARIATIONS,
by Guido Stampacchia. Jul 62, 65p
IMM-NYU-300 Unclassified report
Grant NSF G14520

Descriptors: (*Calculus of variations, Integrals), (*Integrals, Calculus of variations), Boundary value problems, Nonlinear differential equations.

PB-167 876 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
LIMITS OF ENTIRE FUNCTIONS WHOSE GROWTH AND ZEROS ARE RESTRICTED,
by S. Hellerstein and J. Korevaar. 1 Aug 62, 15p
Technical rept. no. TR-2
Grant NSF G19701

Unclassified report

Descriptors: (*Functions, Polynomials), Sequences, Theory, Complex variables.

PB-167 877 Field 12A
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Applied Mathematics and Statistics Labs.
HOLOMORPHIC FUNCTIONS WITH POSITIVE REAL PART ON POLYCYLINDERS,
by A. Koranyi and L. Pukanszky. 20 Jul 62, 17p
Technical rept. no. TR-1
Grant NSF G19701

Unclassified report

Descriptors: (*Functions, Complex variables), Integrals, Polynomials, Theory.

The classical Riesz-Herglotz integral representation and Pick-Nevanlinna interpolation theorems are generalized to functions of several complex variables.

13. Mechanical, Industrial, Civil, and Marine Engineering

HW-SA-3414 Field 13I, 13M
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
FLAME-STRAIGHTENING STRUCTURAL MEMBERS,
by E. B. Lavelle and R. R. Miles. 12 Mar 64, 10p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Structural parts, Torches), (*Torches, Structural parts).

N65-16887 Field 13F, 13K
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
INLET NOISE STUDIES FOR AN AXIAL-FLOW SINGLE-STAGE COMPRESSOR,
by W. Latham Copeland. Feb 65, 19p
NASA-TN-D-2615

Unclassified report

Descriptors: (*Axial-flow compressors, Noise).

Patent 2,971,471 Field 13K

PUMP.
Patent assigned to Air Force,
by Eugene C. Huebschman. 14 Feb 61
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Electromagnetic pumps, Patents), Magnetics, Flexible structures, Pipes.

Two pumps, connected in tandem and operated alternatively, produce a continuous flow of fluid in a tube structure. Magnets are used to produce a continuous flow by alternating between the pump's pressing and resting positions. The pumping device can be used to replace hydraulic brakes in automobiles. It can be made to surround an arm or leg and thus massage or cause circulation to continue. The device can be used by man during the boost phase of a space flight to aid the movement of the spaceman's blood.

Patent 3,136,565 Field 13F

SUSPENSION MECHANISM.
Patent assigned to Army,
by Thomas J. Bischoff and Rayburn A. Hartwig.
9 June 64
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Suspension devices, Vehicle wheels), (*Vehicle wheels, Suspension devices), Vehicle chassis components, Supports, Springs, Patents.

The pivoted seat is for use with the coil springs of a vehicle suspension system. The structure eliminates the necessity of providing guide devices to prevent spring buckling. The coil spring seat support is pivoted on a suspension arm.

Patent 3,182,621 Field 13J, 14B

LIFT-APPENDAGE FOR UNDERWATER VEHICLE.
Patent assigned to Navy,
by Theodore F. Fletcher. 11 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Underwater propulsion, Oceanographic vessels), Life, Propellers(Marine), Patents.

The lift-appendage is associated with a wheeled underwater vehicle to permit the vehicle to rise vertically, proceed in a horizontal direction and then return to the bottom. The underseas vehicle may be used in mining of minerals. A rotating blade device is utilized to provide lifting and prepelling forces.

Patent 3,182,623 Field 13J, 21E

STRUCTURE FOR SUBMARINE JET PROPULSION.
Patent assigned to Navy,
by Guenther W. Lehmann. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Submarines, Jet propulsion), (*Jet propulsion, Submarines), Underwater propulsion.

The shaftless jet-type propulsion system is for propelling a submarine. The propulsion system aside from the power source, is wholly contained outside the submarine pressure hull. The jet system is mounted within a floodable tail structure through which the jet propulsion ducts run. Impellers are associated with electromotors of the shaftless submersible type.

Patent 3,183,024 Field 13E

RADIAL WEDGE JOINT.
Patent assigned to Navy,
by Jack A. Myers and Langthorne P. Sykes. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Joints, Wedges), Rocket components, Torpedo components, Stresses, Patents.

The radial wedge joint is utilized for securing together sections of a rocket or a torpedo. The tubes to be joined have the same outside diameter. The tubes to be joined have structure on their respective ends permitting them to telescope. Tapped apertures in the joined ends receive threaded screws.

Patent 3,183,724 Field 13L

MECHANICAL ROTARY ACCELERATION SENSOR.
Patent assigned to Navy,
by Edward J. McQuillen. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Accelerometers, Control systems), (*Towing cables, Control systems), Acceleration, Deceleration, Winding, Patents.

The mechanical rotary acceleration device senses both acceleration and deceleration of a rotating member and responds to control switches or the like to correct the acceleration. The device is used in the field of air-launched, towed targetry in which a combination reel and launcher assembly is secured to a towing aircraft. The device precludes the power unit, tow line and target from accelerating beyond acceptable limits during the reeling operation.

Patent 3,183,936 Field 13E

EXPANSION JOINT.
Patent assigned to AEC,
by Rudolph Michel. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Expansion joints, Flexible structures), Fluid flow, Pressure, Thrust, Radioactivity, Corrosive liquids, Patents.

The flexible slip type expansion joint is suitable for use in a system carrying a fluid under pressure. End thrust is equalized within the joint by use of a balance chamber pressurized by the transported fluid, a leak-off reservoir in which the pressure may be varied, and a pressure regulating valve for controlling the pressure in the leak-off reservoir. The system may be used for conveying radioactive fluids and corrosive fluids.

Patent 3,183,990 Field 13F

MULTIPLE TRACK STEERING APPLICATION FOR A PLURALITY OF VEHICLES.
Patent assigned to Army,
by Theodoric B. Edwards. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tracked vehicles, Guidance), Variable-speed drives, Electric motors, Vehicle tracks, Multiple operation, Patents.

A plurality of multiple track vehicles are flexibly coupled together in end to end relationship. Each vehicle has endless drive tracks driven by two or more electrical motors as a group. Each group has a separate generator. Steering is accomplished by a manually steered vehicle of a coupled together vehicle group. A mechanical-electrical hitch steering assisting arrangement is provided.

Patent 3,184,275 Field 13A, 9A

FORCED AIR COOLING OF ELECTRONIC EQUIPMENT.
Patent assigned to Air Force,
by Colin D. Gardner. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Electronic equipment, Air cooled), (*Cooling and ventilating equipment, Electronic equipment), Cooling fans, Blowers, Containers.

The air cooled cabinet is for electronic equipment. The outer cabinet is divided by partitions to form individual compartments. A drawer containing electronic equipment is positioned in each compartment. Forced air is provided by an electric fan. Valves in the back of each compartment are open only when the drawer in that compartment is closed.

Patent 3,184,789 Field 13B

APPARATUS FOR LARGE-SCALE APPLICATION OF MONOMOLECULAR LAYERS TO WATER SURFACES USING MELTED MATERIAL.
Patent assigned to Interior,
by Quentin L. Florey and Lloyd O. Timblin, Jr. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Sprays, Alcohols), (*Melting, Alcohols), (*Alcohols, Monomolecular films), Spray tanks, Spray nozzles, Heaters, Water supplies, Herbicides, Insecticides.

The apparatus produces efficiently and economically a finely divided powdered form of a higher fatty alcohol. The spraying apparatus includes a spray nozzle, a tank, a heater and a pressure source. Hexadecanol (cetyl alcohol) may be used. The material forms a monomolecular film on the surface of waters in lake and reservoirs and lowers the evaporation rate. The apparatus can be used for spraying herbicides and insecticides or for spraying food stuffs for fish.

Patent 3,184,849 Field 13I

MINI-CAM TRACER PLATE.
Patent assigned to AEC,
by Edward J. Sass. 25 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Lathe tools, Machining), Lathes, Jigs, Patents.

The mini-cam tracer plate allows generation of various radii tangent angle configurations to tolerances as close as .0002 inch by the simple adjustment of a pivoted tracer arm assembly. It can also be used in conjunction with simple cams to generate complex shapes. The device can be used with any standard tracer lathe equipped with a control stylus and normally used with cams.

Patent 3,184,967 Field 13G, 20D

ELECTRIC CHARGE FLOW METER.
Patent assigned to Army,
by Elmer B. Rogers. 25 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Flowmeters, Electric currents), (*Measuring devices(Electrical + electronic), Fluid flow), Additives, Turbulence, Digital computers, Control systems, Data processing systems, Patents.

The velocities and acceleration of fluids flowing in very small diameter conduits are obtained without introducing turbulence into the flow. An additive, such as talcum powder, is electrically charged. Electrostatic induction measuring devices are placed at various points downstream from where the particles are introduced into the stream. The fluid system can be used as a portion of a control or data conversion system, as in digital computers.

Patent 3,185,165 Field 13A, 13M

BAFFLE VENT FOR AIR SUPPORTED BUILDING.
Patent assigned to Army,
by Walter W. Bird, George F. Reitmeiser and Anson T. Baschmann. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Inflatable structures, Ventilation), (*Ventilation, Inflatable structures), (*Valves, Inflatable structures), Patents.

The inflatable building structure is of the type having an airtight envelope erected and supported by maintaining the air in the envelope under a pressure somewhat greater than atmospheric. The buildings are used because of the ease of erection and striking and the freedom of the interior from obstructions. Venting apparatus is provided to bleed off foul, humid and warm air.

Patent 3,187,709 Field 13J

ADJUSTABLE HEIGHT PROPELLER AND DRIVE ASSEMBLY.
Patent assigned to Army,
by Theodoric B. Edwards. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Propellers(Marine), Positioning devices-(Machinery)), (*Drives, Propellers(Marine)), Patents, Marine surface propulsion, Boats, Amphibious vehicles.

The adjustable height propeller and drive assembly is for use with a marine or amphibious craft equipped with an inboard engine. The propeller can be selectively raised and lowered and is operable at any selected position. It can also be used for steering the craft. The unit can be employed effectively with a craft whose drive shaft passes through the transom at a relatively low position.

Patent 3,188,381 Field 13J, 13E, 9C

QUICK-DISCONNECT CABLE CLAMP.
Patent assigned to Navy,
by Stephen L. Stillman, Jr. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Underwater equipment, Clamps), (*Clamps, Electric cables), (*Disconnect fittings, Clamps), Towing cables, Aircraft, Patents, Encapsulation, Watertight fittings, Oceanographic equipment.

The clamp is used with electric cables used for lowering or towing electrical equipment at great depths from surface vessels or aircraft. A cable splice is made by encapsulating the splice with a moldable, waterproof compound retained within a single well or a pair of cooperating wells formed in confronting faces of a pair of retaining plates.

Patent 3,189,303 Field 13M, 13G

PNEUMATIC SYSTEM FOR MACHINERY SUPPORT.
Patent assigned to Navy,
by Willis A. Boothe. 15 Jun 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Supports, Machines), (*Vibration isolators, Supports), (*Pneumatic devices, Supports), Pneumatic systems, Vibration, Valves, Springs, Patents.

The support is for reducing or isolating machinery vibration. The mount provides an air spring, for example, an expansible bellows type pneumatic container for supporting a load and a system for supplying air to the container in accordance with the force applied thereto by the load. The pneumatic system utilizes an air source for supplying air to a first valve which is positioned to be actuatable by the force of the load and designed to produce a pressure which is proportional to force of the load. Air from the first regulator is directed through a stabilizing zone to a second valve and from the second valve, the air is delivered to the air spring.

PB-167 648 Field 13J, 21F
CFSTI Prices: HC$5.00 MF$1.00

General Dynamics Corp., Groton, Conn. Electric Boat Div.
THE FEASIBILITY AND DESIGN OF NUCLEAR-POWERED SUBMARINE TANKERS.
1 Dec 58, 166p Unclassified report
Contract MA1718
Available copy will not permit fully legible reproduction.

Descriptors: (*Nuclear powered vessels, Submarines), (*Tankers, Submarines), (*Submarines, Tankers), Design, Feasibility studies, Ballast tanks, Hulls-(Marine), Submarine hulls.

The report describes the technical information developed for a feasibility study of nuclear powered submarine tankers. It also describes the steps taken in reaching the conclusions presented. The scope of this contract as written consisted of two parts: (1) The first part was an investigation of the size, shaft horsepower, and principal dimensions of submarines of 20,000, 30,000, and 40,000 tons deadweight; 20, 30, and 40 knots speed on trials submerged; both with and without a draft limitation of 34 feet. This represented a parametric series of 18 vessels. (2) The second part was a more complete feasibility study of one sample vessel to be selected by the Maritime Administration. The scope of the parametric series was later increased from 18 to 27 vessels because the vessels without draft limitations were studied with two different hull forms. These were the practical rectangular form and the hydrodynamically ideal body of revolution.

PB-167 654 Field 13B, 8A, 6C
CFSTI Prices: HC$6.00 MF$1.50

Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
BIOLOGICAL PROBLEMS IN WATER POLLUTION, comp. by C. M. Tarzwell. 1960, 298p
Technical rept. no. W-60-3 Unclassified report
Transactions of the Seminar on Biological Problems in Water Pollution(2nd), held April 20-24, 1959, at Cincinnati, Ohio.

Descriptors: (*Water pollution, Marine biology), (*Sanitary engineering, Water pollution), Radiobiology, Radioactivity, Aquatic animals, Fishes, Forestry, Insecticides, Pesticides, Herbicides, Sprays, DDT, Toxicity, Ecology, Erosion, Refineries, Wastes-(Industrial), Wastes(Sanitary engineering), Biological assay, Collecting methods, Symposia.

Contents:
Effects of the Discharge of Radioactive Materials on Aquatic Life
Effects of Pesticides on Aquatic Life
Environmental Requirements for Aquatic Life
Practical Application of Biological Findings in Pollution Abatement
Marine and Estuarine Pollution Problems
Informal Group Discussions
Oil Refinery Waste Problems.

PB-167 781 Field 13B
CFSTI Prices: HC$1.00 MF$0.50

Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
AN AIR POLLUTION INCIDENT IN TERRE HAUTE, INDIANA. THE STUDY PLAN AND STUDY, by James D. Williams and Walter S. Smith.
1964, 13p Unclassified report

Presented at the Conference on Air Pollution Control (3rd), October 27-28, 1964, Memorial Center, Purdue University, Lafayette, Ind.

Descriptors: (*Air pollution, Indiana), (*Public health, Air pollution), Urban areas, Waste gases, Odors, Sanitary engineering, Samplers, Terrain, United States Government, Control.

PB-167 785 Field 13H, 11F
CFSTI Prices: HC$2.00 MF$0.50

Naval Applied Science Lab., Brooklyn, N. Y.
OUT-OF-CHAMBER SEMI-AUTOMATIC WELDING OF Ti-7A1-2Cb-1Ta ALLOY TITANIUM PLATE.
Progress rept. no. 4,
by Herbert Nagler, Joseph R. Crisci, and Alfred L. Frank. 28 Dec 64, 36p Lab. proj. 6377-4
Projs. SF013 01 03, SR007 01 02, Tasks 0216, 0704
AD 455 662 Unclassified report

Descriptors: (*Titanium alloys, Arc welding), (*Arc welding, Titanium alloys), (*Metal plates, Arc welding), Aluminum alloys, Niobium alloys, Tantalum alloys, Submarine hulls, Welds, Toughness, Mechanical properties, Arc welds.

This report presents the results of an investigation to develop procedures for out-of-chamber welding of thick titanium alloy plate that would be suitable for the fabrication of deep submersible hull structures. It is shown that out-of-chamber, inert gas metal arc short-circuit welding techniques, developed at the U. S. Naval Applied Science Laboratory, are effective in producing high strength, notch tough butt welds in one inch thick Ti-7A1-2Cb-1Ta alloy titanium plate. Variation of the aluminum content of the filler wire used to produce the welds is shown to have a significant effect on the strength and notch toughness of the weld. Welds produced with Ti-721 (7% A1) filler wire are stronger than the base plate but their notch toughness is slightly below that of the base plate. Welds produced with Ti-621 (6% A1) or Ti-521 (5% A1) filler wire provide weld toughness significantly superior to that of the base plate, at some sacrifice in strength. Welds produced in Ti-721 alloy titanium by the short-circuit process show evidence of fine porosity and cold shutting; however, despite the presence of these defects the mechanical properties of the short-circuit welds were generally equal or superior to those of corresponding spray welds produced in earlier work. A recommendation is made to tentatively adopt short circuit welding techniques for out-of-chamber vertical position welding of heavy section Ti-721 alloy titanium, pending the development of improved techniques. (Author)

SB-441 Rev. Suppl. 1 Field 13H

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
EXPLOSIVE FORMING.
Price list, selective bibliography of government research repts. and translations for Dec 61-Mar 65.
Mar 65, 8p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Bibliographies, Explosive forming), (*Explosive forming, Bibliographies), Forging, Extrustion, Welding, Material removal, Industrial equipment, Machines, Metals.

Lists 85 domestic and foreign references on explosive forming added to the CFSTI collection from December 1961 through March 1965. Includes research on high energy rate forging and extrusion, explosive welding and cutting of metals, sheet metal forming technology, discharge and direct contact explosive metal forming, electro-spark extruding, method of forging by explosion, and use of the Dynapak machine.

SB-448 Rev. Suppl. 1 Field 13B

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
AIR POLLUTION AND PURIFICATION.
Price list, selective bibliography of government research repts. and translations for Sep 63-Mar 65.
Mar 65, 15p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Air pollution, Bibliographies), (*Bibliographies, Air pollution), (*Purification, Air), Radioactive fallout, Smokes, Exhaust gases, Poisonous gases, Aromatic compounds, Dust, Aerosols, Radioactive isotopes, Gas filters, Beryllium, Control.

Lists 180 references on air pollution and purification added to the CFSTI collection from September 1963 through March 1965. Includes research on air pollutants from radioactive fall-out, smoke, automobile exhaust (carbon monoxide), toxic gases, aromatic hydrocarbons present in nuclear submarine atmospheres, beryllium, rocket exhaust, et cetera; control of air pollution; dust control techniques for clean rooms; recording of the aerosol content of radioactive isotopes in air; microbiological methods of testing the atmosphere; new methods of cleaning and purifying air; air intake and charcoal filters; air regeneration, et cetera.

SB-476 Suppl. 1 Field 13D

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
CONTAINERS, PACKAGING, STORAGE, ETC.
Price list, selective bibliography of government research repts. and translations for Nov 61-Mar 65.
Mar 65, 27p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Bibliographies, Packaging), (*Containers, Bibliographies), (*Packaging, Bibliographies), (*Storage, Bibliographies), Food, Packing materials, Materials, Paper, Plastics, Preservation, Metals, Handling.

Lists 425 domestic and foreign references on containers, packaging, storage, etc. added to the CFSTI collection from November 1961 through March 1965, as well as selected reports on the subject received in the collection through 1957. Includes research on paperboard, plastic, titanium and aluminum containers used for packaging and storing irradiated and thermally processed foods; paper honeycomb and foamed plastics used as cushioning material; stretch laminated aluminum used in cans; titanium containers for liquid propellants; containers for guided missiles; transparent plastic film; light weight wood containers; epoxies useful in packaging electronic equipment; encapsulation of foods; collapsible containers fabricated of steel, wood, fiberboard, plastics, etc.; packaging materials resistant to chemical warfare agents; glass containers; shipping containers; plastic bags; packing cases for flowers; packing liquid or pasty products; storage and handling of liquids, canned food, fresh fruits and vegetables; cargo handling of chemicals and high-energy materials; cooperative storage warehouses and preservation methods for storing material; specifications for crates, boxes; design of pallet pattern selection, wood pallets and cleated plywood boxes; packaging system materials capable of producing a dehumidified or moisture-controlled atmosphere.

SB-498 Suppl. 1 Field 13B

Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.
WATER POLLUTION AND WATER PURIFICATION (INCLUDING RADIOACTIVE CONTAMINATION AND DECONTAMINATION).
Price list, selective bibliography of government research repts. and translations for Jul 62-Mar 65.
Mar 65, 15p Unclassified report

Available free from the Clearinghouse.

Descriptors: (*Water pollution, Bibliographies), (*Water supplies, Purification), (*Bibliographies, Water supplies), Decontamination, Radiological contamination, Minerals, Carbon dioxide, Wastes(Industrial), Bacteria, Oxygen consumption, Biological contamination, Contamination.

Lists 163 references on water pollution and purification added to the CFSTI collection from July 1962 through March 1965. Includes research on water pollution caused by ground water contaminants, minerals, carbon dioxide freeze-out, chemicals and industrial wastes; method of radium determination in water; bacteria and rate of oxygen consumption in waters of varied degree of pollution; water purification by hydrate process, demineralization and freeze demineralization of saline water conversion; deionizing of water by cellulose; laundry water recovery by flotation; reagents used for water softening material; removal of chemical, biological and radiological contaminants from water; testing of filter conditions; and research on treatment of water and radioactive residues.

14. Methods and Equipment

CAPE-1184 Field 14E

Los Alamos Scientific Lab., N. Mex.
TURBINE DRIVEN MIRRORS, MODELS 231 AND 232.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Mirrors, Cameras), Turbines, Mechanical drawings.

The turbine driven mirrors described are used with the Framing Camera, Model II. The model-231 mirror

has a speed of 11,000 rps and the faces of the mirror are 20 x 20 mm. The model-232 mirror has a speed of 10,000 rps and the faces of the mirror are 25 x 38 mm. (For details, see TID-4100.) Includes 10 drawings. (AEC Abstract)

Patent 3,182,496 Field 14B

ELECTRIC ARM DRIVEN WIND TUNNEL.
Patent assigned to NASA,
by Oscar C. Holderer. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Wind tunnels, Electric arcs), (*Electric arcs, Wind tunnels), Design, Patents.

A system of triggering an arc of an electrical arc driven wind tunnel is disclosed. Only a single primary insulated electrode is required because of the use of a pressure vessel wall as the second primary electrode. The spark is initiated between the electrode and wall by a path of ions whereby the need of any external high voltage switching equipment is eliminated.

Patent 3,182,499 Field 14B, 20F

METHOD OF MEASURING WIND VELOCITY.
Patent assigned to AEC,
by Harry Moses. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Wind, Measurement), Infrared equipment, Design, Patents, Velocity.

Ground based equipment is used in measuring wind velocity. Infrared radiation is intermittently transmitted at a predetermined frequency into the atmosphere whereby the radiation heats a portion thereof. Ground based infrared detectors are used to scan the heated portion of the atmosphere at determined time intervals and determine the spatial coordinates thereof. From the spatial coordinates and the time intervals, the velocity of the heated portion of the atmosphere and hence the wind velocity is computed.

Patent 3,182,509 Field 14B

HIGH PRECISION MANOMETER.
Patent assigned to Navy,
by James M. Kendall and George W. Payne. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Manometers, Design), Wind tunnels, Instrumentation.

The precision manometer has utility in a supersonic on hypersonic wind tunnel for the measurement of small pressures. The equipment consists of a manometer tube with necessary valves, a vacuum or pressure reference system, special illumination which allows the miniscus position to be accurately determined and a temperature correlated apparatus for accurately determining the true reading of the column in the manometer.

Patent 3,183,512 Field 14B, 14C, 1D

MECHANICAL GRAPHIC RECORDING OMNIDIRECTIONAL ACCELEROMETER.
Patent assigned to Navy,
by Alfred B. Castle. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D. C., 20231, $0.25

Descriptors: (*Accelerometers, Recording systems), (*Recording systems, Accelerometers), Aircraft equipment, Carrier landings, Graphics, Patents.

The omni-directional instrument is suitable for use on an aircraft for determining the acceleration forces to which the aircraft is subjected upon catapulting and arrestment aboard an aircraft carrier. Two accelerometer units are utilized. A mass is displaceable by acceleration forces and a graphic recording is made by a stylus on a wax surface.

Patent 3,184,097 Field 14B, 1A

VALVE WITH EXPLODING DIAPHRAGM.
Patent assigned to Navy,
by Earl E. Kilmer and Rayner A. Montgomery.
18 May 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Diaphragms(Mechanics), Shock tubes), (*Valves, Diaphragms(Mechanics)), Design, Patents, Detonations, Combustion, Aerodynamic configurations, Gas flow.

The high speed explodable diaphragm is used at the muzzle end of a shock tunnel. The muzzle end opens into a test chamber in which is mounted an aerodynamic shape to be tested. The diaphragm confines a column of air within the barrel of the shock tunnel until it is quickly opened by detonation of a charge leaving only the products of combustion to be expelled into the test chamber.

Patent 3,184,955 Field 14B

EXPLOSIVE DRIVEN CONICAL SHOCK TUBE.
Patent assigned to Navy,
by William S. Filler. 25 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Shock tubes, Conical bodies), (*Explosive initiators, Shock tubes), Design, Shock waves, Propagation, Sheres, Patents.

A small quantity of high explosive is disposed within a firing chamber in communication with the small end of a conical shock tube. It is employed to generate a spherical shock wave within the tube of greatly amplified character and corresponding in blast intensity or strength to that of a much larger quantity of high explosive detonated in the free air at a selected distance from the point of measurement thereof. The amplification factor of the apparatus varies in an inverse ratio to the angle of the conical interior surface of the shock tube.

Patent 3,185,023 Field 14B, 13H

OPTICAL INSPECTION APPARATUS.

Patent assigned to NASA,
by Willis G. Groth. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Conical bodies, Optical analysis), (*Optical analysis, Conical bodies), (*Quality control, Conical bodies), Surface properties, Determination, Pipes, Rocket motors(Liquid propellant), Test equipment, Patents.

The optical inspection apparatus is used for determining the roundness and regularity of a cone surface. Fittings with cone surfaces are used with tubing in liquid propellant rocket vehicles. The apparatus is extremely accurate and easily detects chatter marks and irregularities of a cone surface down to and including 0.0001 inch.

Patent 3,185,063 Field 14E

MAGNETICALLY ACTUATED SHUTTER.
Patent assigned to AEC,
by Franklin C. Ford, Edwin B. Nelson, William M. Trimble and Samuel G. Zizzo. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Camera shutters, High-speed cameras), (*High-speed cameras, Camera shutters), Magnetic switches, Solenoids, Photographic equipment, Patents.

The magnetically actuated shutter is for high speed cameras having closing times in the microsecond range. It causes no attenuation or distortion of incoming light and may be placed anywhere in the path of incoming light. Light from the event of interest passes through a thin-walled metallic tube. High current introduced into a solenoid causes an inward magnetic-field pressure which crushes the tube and cuts off the light.

Patent 3,187,558 Field 14B

SOLID STATE PORTABLE GAS LEAK DETECTOR.
Patent assigned to Navy,
by Raymond Earl Koncen and Alexander Hafner. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Monitors, Gases), (*Gases, Monitors) Portable, Pressure vessels, Containers, Ma'functions, Failure(Mechanics), Submarines, Pipes, Thermal conductivity, Patents, Sensitivity.

The portable gas leak detector is useful in installations having containers or pipes which carry gas under pressure, such as tanks and bottles of hydrogen, in natural gas installations and for testing for leaks in refrigeration and air-conditioning equipment. The detector is particularly useful on submarines. The device embodies a thermal conductivity Wheatstone bridge.

Patent 3,187,583 Field 14B, 22A

SPACE SIMULATOR.
Patent assigned to NASA,
by Melvin N. Wilson, Jr., and Carl Thiele. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Space environmental conditions, Simulators), (*Simulators, Space environmental conditions), Test equipment, Venus, Solar radiation, Spacecraft, Models (Simulations), Patents.

The space simulator produces radiations simulating the high intensity solar radiations believed to exist in the region of the planet Venus. The test chamber is dimensioned to receive a model of a space vehicle. An optical system is used to transmit radiation from a plurality of sources externally of the test chamber through a wall of the test chamber.

Patent 3,187,970 Field 14E

CYCLE TIMING MECHANISM.
Patent assigned to Army,
by Walter Rayve. 8 June 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Photographic processors, Timing devices), (*Timing devices, Photographic processors), Mechanical scanning, Cams, Rotation, Motion, Photographic film, Velocity.

The mechanism controls the speed at which processed photographic film passes a scanning slit. A cam arrangement is provided in combination with a plurality of sources of rotational motion for moving film in a cyclic manner which includes two different speeds of forward movement. The scanning apparatus is used to determine the extend to which the processing of the film has been completed.

Patent 3,188,618 Field 14B

POSITIVE LOCKOUT CONTROL FOR OIL AND WATER BATHS.
Patent assigned to Army,
by John C. Rentz. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Temperature control, Laboratory equipment), (*Laboratory equipment, Temperature control), Control systems, Temperature sensitive elements, Electrical equipment, Patents.

The control unit is interposed between an electrical supply such as a 115 volt socket and a load, which may be an oil or water bath or constant temperature drying oven and the like, which it is sought to maintain at constant temperature. If the water temperature rises beyond a preset maximum, a heat sensitive control triggers the unit to cut off the power and a signal light comes on. The unit can be used as a burglar alarm.

PB-167 818 Field 14B, 6R
CFSTI Prices: HC$1.00 MF$0.50

School of Aerospace Medicine, Brooks AFB, Tex.
A SURVEY OF PROTON EXPOSURE FACILITIES.
Jun 64, 9p SAM-TDR-64-16
Task 775704
AD 443 784 Unclassified report

Descriptors: (*Test facilities, Whole body irradiation), (*Protons, Whole body irradiation), (*Whole body irradiation, Space medicine), Space environmental conditions, Proton beams, Cyclotrons, Dose rate.

The Bionucleonics Department of the USAF School of Aerospace Medicine is planning a series of primate whole-body experiments in support of the space radiation program. Proton facilities in the United States and Europe were surveyed for the purpose of selecting sources of protons for use in these studies. A 1 in. x 6 in. proton beam with an average whole-body surface dose rate of 15 rad/min. can be duplicated at all facilities visited. However, laboratory space for use by visiting organizations is limited, and cyclotron time must be approved far in advance by the scheduling committee at each facility. Approximately 12 to 16 months will be required to complete the animal exposures. Final selection of exposure facilites and programing of cyclotron time will be made at a later date. (Author)

PB-167 826 Field 14D, 9E, 13I
CFSTI Prices: HC$4.00 MF$1.00

IIT Research Inst., Chicago, Ill. Technology Center.
METHODS FOR PREDICTING COMBINED ELECTRONIC AND MECHANICAL SYSTEM RELIABILITY.
Rept. no. 4 (final) 1 Jul 62-30 Sep 63,
by Thomas L. Bush, Anthony P. Meyers, and Darwin F. Simonaitis. 30 Sep 63, 134p Rept. no. IITRI-5186-4
Contract DA36 039SC90864, Proj. 3X90 90 004, E186
AD 434 018
Unclassified report

Descriptors: (*Reliability, Army equipment), (*Electronic equipment, Reliability), (*Mechanical engineering, Reliability), Failure(Mechanics), Fatigue(Mechanics), Gears, Clutches, Acutators, Mathematical prediction, Electrical equipment.

The reliability evaluation methodology developed in this program was based upon the utilization of knowledge on mechanical failure mechanisms and its application to major part failure modes, including the use of available statistical information on failure mechanisms. The major failure mechanisms studied were fatigue and surface fatigue. The principal mechanical parts studied were gears (fatigue and surface fatigue analysis) and rolling contact bearings (using available failure mode and failure distribution data). In addition, the fatigue reliability concept developed for gears was also considered for application to shafts and positive engagement clutches. A theoretical model for evaluating adhesive wear was also studied, however, more information on several aspects of related mechanical phenomena is necessary before general application of the adhesive wear concept can be made in reliability evaluation. The concepts studied in the program and the reliability prediction technique as developed were then demonstrated in a sample evaluation of an electro-mechanical device, a rotary-drum flight control actuator. (Author)

WAPD-288 Field 14B
CFSTI Prices: HC$2.00 MF$0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
TEST RIG FOR USE IN WEAR AND FRICTION STUDIES IN A WATER ENVIRONMENT,
by N. B. Dewees. Mar 65, 39p
Contract AT(11-1)-GEN-14
Unclassified report

Descriptors: (*Wear resistance, Test facilities), (*Friction, Test equipment).

15. Military Sciences

Patent 3,183,499 Field 15C

HIGH DIRECTIVITY SOLID CURTAIN PERIMETER INTRUSION SYSTEM.
Patent assigned to AEC,
by Richard G. Cowen. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Warning systems, Electromagnetic waves), Phototubes, Patents.

The system is designed to protect a room or building against theft. The system detects intrusion through a highly directive solid curtain or plane of radiation. The system utilizes a vertically disposed elongated source of radiation at one end of a room or side of a window and a multiplicity of radiation sensitive cells at the other end of the room or side of the window.

PB-167 686 Field 15G, 12B
CFSTI Prices: HC$3.00 MF$0.75

RAND Corp., Santa Monica, Calif.
SYSTEMS ANALYSIS VERSUS SYSTEMS DESIGN,
by A. J. Wohlstetter. 29 Oct 58, 67p
Rept. no. P-1530
AD 224 128
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Systems engineering, Air force operations), (*Operations research, Air force operations), (*Air force operations, Systems engineering), Effectiveness, Mission profiles, Strategic Air Command, Military tactics, Military strategy, Theory.

This report examines the effectiveness of systems analysis versus systems design in formulating Air Force operations.

16. Missile Technology

N65-16578 Field 16D
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EFFECT OF FIN-FLARE COMBINATIONS ON THE AERODYNAMIC CHARACTERISTICS OF A BODY AT MACH NUMBERS 1.61 AND 2.20,
by Clyde Hayes and Roger H. Fournier. Feb 65, 38p
NASA-TN-D-2623
Unclassified report

Descriptors: (*Guided missiles, Aerodynamic characteristics), (*Flared afterbodies, Fins).

Patent 3,182,554 Field 16A

MISSILE EJECTION METHOD AND APPARATUS.
Patent assigned to Navy,
by Edward J. Barakauskas. 11 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Ejectors(Ordnance), Underwater), (*Guided missile launchers, Ejectors(Ordnance)), Design, Patents.

The apparatus is for the vertical ejection of a missile from a launching tube carried by a submarine. A pressurized fluid is utilized. The normal compressed air source is replaced by a gas generator which preferably includes a fuel in solid form which is not ignited until the time where the launching is to be actually carried out.

Patent 3,182,930 Field 16B, 16A, 17I

MISSILE IN FLIGHT INDICATOR.
Patent assigned to Navy,
by Joseph P. Randolph, Jr., Henry B. Riblet, and John W. Hamblen. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Guided missile tracking systems, Display systems), Radar tracking, Radar equipment, Airborne, Ground support equipment, Fire control systems, Patents.

The indicator system consists of airborne and ground equipment. The airborne equipment in each missile receives a signal from a guidance radar via the guidance receiver in the missile, and retransmits it by a transponder, also in the missile, to special ground equipment including a receiver and decoder. The signals from all the missiles are displayed on a counter connected with the decoder as the number of missiles in the radar beam at a given time. The signals are also displayed on a rangescope, connected with the counter, which shows the range to each missile and to the target.

Patent 3,183,904 Field 16A

WATER INJECTION FOR EJECTION PERFORMANCE BOOST.
Patent assigned to Navy,
by Edward J. Barakauskas. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Guided missile launchers, Water injection), (*Water injection, Ejection), Guided missiles(Underwater-to-surface), Performance-(Engineering), Energy, Submarines, Compressed air, Water, Freezing, Patents.

The missile launching apparatus is for increasing the energy of launching of a missile from a submarine. The missile is launched from underwater. Compressed air and water are used. The additional energy is provided in a form which due to the temperature drop caused by the expansion of the compressed air produces a freezing action on water injected therein and in freezing such water liberates sufficient heat to provide energy for increasing the linear speed of the missile.

Patent 3,184,726 Field 16D

RECOVERABLE MONITORING CIRCUIT WITH PERMANENT INDICATION.
Patent assigned to Navy,
by Leroy L. Hellgren. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Monitors, Guided missile components), (*Electrical networks, Monitors), Malfunctions, Recording systems, Pyrotechnics, Circuits, Recovery, Patents.

The monitoring circuit indicates the sequence of events in circuitry, such as the ignition, separation, arming, and so forth of a missile while it is in flight. Pyrotechnic indicators are connected in the missile circuitry in such a way that they do not effect the function of the circuitry.

Patent 3,185,097 Field 16C

MISSILE STABILIZING MEANS.
Patent assigned to Navy,
by Vincent J. Cushing and Walter A. Beaudry.
25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Fins, Cluster warheads), (*Cluster warheads, Guided missile warheads), (*Guided missile warhead, Cluster warheads), Rockets, Bombs, Torpedos, Ordnance, Patents.

The warhead may be incorporated in a guided missile, rocket, bomb, torpedo or other ordnance item. It has banks of submissiles which are dispersed toward a target. Each submissile has three fins which lies flush with the sides of the missile when the missile is packaged. In the open position the three fins form a symmetrical aerodynamic configuration.

Patent 3,187,631 Field 16A

MISSILE LAUNCHER DETENT.
Patent assigned to Navy,
by Roy Cromwell and John T. Bratton. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Detents, Guided missile launchers), (*Guided missile launchers, Detents), Rocket propulsion, Ships, Motion, Thrust, Patents.

The launcher is for launching a rocket propelled missile from a ship. The detent system positively locks the missile against longitudinal movement along its launching rail until the missile is ready to be launched, thereby retaining the missile in the launcher in the event of unauthorized premature firing of the missile thrust motor.

PB-167 893 Field 16A
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
THE USE OF RELIABILITY ESTIMATES IN THE DESIGN OF MISSILE PRELAUNCH CHECKOUT EQUIPMENT,
by Sidney I. Firstman. 5 Jan 60, 44p
Rept. no. P-1853
AD 224 308 Unclassified report

Descriptors: (*Checkout equipment, Guided missiles), (*Guided missiles, Checkout equipment), Design, Reliability, Checkout procedures, Decision theory, Probability, Optimization.

If all the prelaunch tests that would be desirable cannot be scheduled because of the operational necessity to launch within a limited amount of time, then engineering and operational evaluations must be employed to determine the theoretically optimum content of the limited checkout and also the required capability of the checkout equipment. This paper addresses the problem of making these design decisions and using reliability estimates as the basis for the analysis, develops (a) quantitative criteria for the value of inclusion of individual checks in the checkout, (b) an expression for the required efficiency of the checkout equipment, and (c) a mathematical method for determining the content of a theoretically optimum checkout. The latter result is for the case exemplified by ballistic missiles, where, in general all missile functions are energized prior to launch and where one operational constraint is dominant, namely, time allowed for checkout. The determination of the optimum checkout content can be done graphically, and the method developed can also be used to ascertain the launch confidence achieved by the checkout equipment of present missile systems. (Author)

17. Navigation, Communications, Detection, and Countermeasures

N65-17967 Field 17I
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE ROCKET INTERFERROMETER TRACKING (RIT) SYSTEM,
by Michael Spafford, Richard Wiack, and Ronald Woodman. Mar 65, 24p NASA-TN-D-2682
Unclassified report

Descriptors: (*Guided missile tracking systems, Radio interferometers), (*Radio interferometers, Guided missile tracking system).

Patent 3,183,477 Field 17A

ACOUSTIC DISTANCE MEASURING EQUIPMENT.
Patent assigned to Navy,
by Lauro C. Ricalzone. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Distance-measuring equipment, Underwater equipment), Acoustic equipment, Antisubmarine ammunition, Buoys, Portable, Transponders, Data processing systems, Patents.

The underwater acoustic distance measuring equipment is used to check the accuracy of weapons systems which employ air dropped weapons against submarines. A buoy is dropped with or in place of a weapon. When the buoy strikes the water the transponder disconnects itself from the float, except for a connecting line, and sinks as far as the latter will permit. A data processing unit which is carried by the submarine is set into operation prior to drop and records the miss distance. Neither the submarine operator nor the operator of the weapons systems needs to reveal his position to the other to obtain this data.

Patent 3,183,478 Field 17A, 15A

CORRELATION SONOBUOY SYSTEM AND METHOD.
Patent assigned to Navy,
by Zaka I. Slawsky and Sameul J. Raff. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Sonar equipment, Buoys), (*Buoys, Sonar equipment), (*Antisubmarine warfare, Sonar equipment), Underwater tracking, Antisubmarine aircraft, Patents.

The correlation sonobuoy system is for tracking submarines by aircraft. Acoustic signals generated from the submarine being tracked and radio signals from the tracking aircraft are utilized for positioning the aircraft directly above the submarine.

Patent 3,183,506 Field 17I

RADAR RANGING RECEIVER.
Patent assigned to NASA,
by Mahlon F. Esterling. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Range finding, Radar receivers), (*Radar receivers, Range finding), Radar equipment, Signal-to-noise ratio, Targets, Distance-measuring equipment, Patents.

The receiving system extends the range of a radar system. The arrangement increases the signal-to-noise ratio of the signal received from a distant object. Signals made up of a carrier modulated by the product of clock signals and code signals is transmitted to a distant target to be reflected and thereafter received and utilized by the receiving system for indicating the distance to the target.

Patent 3,184,708 Field 17G

ELECTRICAL GUIDANCE SYSTEM FOR SHIPS.
Patent assigned to Navy,
by William H. Bussey. 18 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Navigational aids, Ships), (*Guidance, Ships), (*Ships, Magnetic guidance), Underwater equipment, Electric cables, Electric equipment, Patents.

The submarine piloting system includes a cable under the water and a detector apparatus on a vessel. A plurality of magnetic poles is provided along the length of the cable. By detecting the presence of poles at as few as two successive locations, it is possible to immediately locate the ship's position along the cable.

Patent 3,184,739 Field 17I

METHOD OF TRACKING RADAR TARGETS IN PRESENCE OF JAMMING.
Patent assigned to Navy,
by Frederick Franklin and Paul K. Giloth.
18 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tracking, Radar jamming), (*Radar jamming, Tracking), (*Aircraft, Tracking), Radar stations, Digital computers, Search radar, Patents.

The method is for tracking the position of a plurality of targets, such as aircraft, in the presence of jamming. The bearings of each of the targets is determined from three different points. The points of intersection of the bearings are computed to determine the unique target positions. This positional information is utilized to track each target.

Patent 3,185,868 Field 17A

ACOUSTIC ABSORBER PAD.
Patent assigned to Navy,
by Forrest E. Coyle and Frank P. Hodges. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Sonar equipment, Acoustic insulation), (*Polyester plastics, Acoustic insulation), (*Acoustic insulation, Sonar equipment), Fibers(Synthetic), Copper, Particles, Piezoelectric transducers, Patents.

The sonar transducer has an improved sound absorbing pad to enable it to obtain better directivity. High frequency sound waves are absorbed by a batt of lose polyester fibers containing a proper proportion of copper chips distributed through it. A pad of this type formed into a pad and placed to one side of a wave emitting tansducer element absorbs the emissions from that side and, consequently, directivity is obtained in that emission only from the free side.

Patent 3,185,980 Field 17B, 1D, 15A

AIRBORNE INTEGRATED DISPLAY SYSTEM.
Patent assigned to Navy,
by Walter R. Gustafson, William H. McMillen, James R. Rounding, Jr., and Leo Shore. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Display systems, Airborne), (*Integrated circuits, Display systems), Antisubmarine warfare, Plotters, Data processing systems, Patents.

The airborne integrated tactical data display system is for use in antisubmarine warfare missions. The system includes an electronic plotter, a dead reckoning tracer, a ground track plotter, and the coordinating and computing elements of a data display group.

Patent 3,188,629 Field 17G

DECODER-READOUT AND DEGARBLER.
Patent assigned to Navy,
by Bernarr H. Humpherys. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Identification systems, Decoding), (*Air traffic control systems, Identification systems), (*Decoding, Identification systems), Display systems, Signals, Separation, Patents.

The active decoder-readout is for use in the selective identification feature modification of the IFF Mark X System thereby enabling fast accurate data acquisition in air traffic control for high speed aircraft. The system uses standard commercially available components and provides a physically large display, a more compact display panel that may be located at any convenient position independent of the decoding equipment and is not limited to 64 codes.

Patent 3,188,634 Field 17G, 17B

DISTANCE MEASURING SYSTEM WITH AUTOMATIC INDEX COMPENSATION.
Patent assigned to Commerce,
by Moody C. Thompson, Jr. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Distance-measuring equipment, Atmospheric refraction), (*Atmospheric refraction, Refractive index), Antennas, Frequency, Cavity resonators, Phase(Electronics), Transponders, Radio receivers, Patents.

The electronic distance measuring system compensates automatically for changes in the refractive index of the atmosphere. This is accomplished by controlling the measuring frequency so that it changes in an inverse relationship to changes in the index of refraction. In a typical embodiment the distance between an antenna in a local station and the antenna in a distant station is measured.

PB-167 534 Field 17G, 1B, 8B
CFSTI Prices: HC$1.00 MF$0.50

Coast and Geodetic Survey, Washington, D. C.
Aeronautical Chart Div.
EFFECT OF STRATIFIED AIRSPACE SYSTEMS ON AERONAUTICAL CHARTING,
by Frank E. McClung. 1961, 5p
Unclassified report

United States Delegation to the United Nations Regional Cartographic Conference for Asia and the Far East (3rd) held at Bangkok, Thailand, 27 October-10 November 1961.

Descriptors: (*Air traffic control systems, Mapping), (*Mapping, Air traffic control systems), Navigation charts, Air traffic, Flight paths, Aeronautics.

PB-167 571 Field 17G, 17A
CFSTI Prices: HC$3.00 MF$0.75

Coast and Geodetic Survey, Washington, D. C.
Instrument Div.
A SUMMARY OF THE CHARACTERISTICS OF SURFACE NAVIGATION SYSTEMS.
Oct 63, 83p
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Navigational aids, Reviews), (*Navigation, Reviews), Distance-measuring equipment, Radio navigator, Loran equipment, Shoran, Hydrographic surveying, Sound ranging.

The characteristics given for the surface navigation systems include frequency band, type (surveying, navigation, distance measuring, rescue), maximum range, present status (whether experimental or obsolete, or where used), plotting method, and accuracy, and the equipment needed on a ship for their use. The systems include the following: Consol, Decca Navigator, Survey Decca, Decca Hi-Fix, Two-range Decca, Delrac, Dectra, Electronic Position Indicator (EPI), Electrotape (formerly Microdist), Gee, Geodimeter, Lambda Decca, Lorac, Loran, Marine Autotraverse Positioner (MAP) Rayflex, Microwave Position-Fixing System (MPFS), Omega-Radux, Pulsed Light Ranging System (Lacrosse), Rafos, Rana, Raydist, Shoran, Sofar, and Tellurometer.

PB-167 742 Field 17B
CFSTI Prices: HC$3.00 MF$0.75

Houston Research Inst., Inc., Tex.
FACSIMILE TRANSMITTAL OF TECHNICAL INFORMATION.
31 May 65, 66p Unclassified report
Sponsored by National Science Foundation.

Descriptors: (*Facsimile communication systems, Feasibility studies), Microwave communication systems, Facsimile transmission, Radio communication systems, Networks, Video networks, Underground structures, Information retrieval, Scientific research, Reports, Libraries.

A study was made of the feasibility of transmitting technical information by facsimile over existing communications networks, including oil and gas pipeline networks, between Houston and the major centers of technical information in the United States. Of the major communication networks evaluated, three offer potential for the nation-wide exchange of technical information: oil and gas pipeline networks, NASA Mission Control Circuits, and Military Amateur Radio Service (MARS). No major technical or legal problems were encountered. The economics of facsimile transmittal were found to be strongly dependent upon other facets of the overall library exchange process, including volume, speed of retrieval and other factors. The inter-relationship of these factors and their bearing on facsimile transmittal costs are discussed. It is concluded that the establishment of a facsimile transmittal system is not justified until after major improvements have been made in present library procedures for information storage and retrieval. (Author)

18. Nuclear Science and Technology

BNL-8943 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
TEMPERATURE CONTROLLER,
by D. Potter and D. Stephani. 23 Mar 65, 10p
Contract AT(30-2)-GEN-16
Unclassified report

Descriptors: (*Temperature control, Instrumentation).

BNL-8950 Field 18K, 20B
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
ANISOTROPIC MIGRATION IN SLAB LATTICES,
by Henry C. Honeck and Bernard C. Quiquemelle.
25 Feb 65, 21p CONF-650504-1
Contract AT-(30-2)-GEN-16
Unclassified report

Presented at IAEA Symposium on Pulsed neutron methods, Karlsruhe, Ger.

Descriptors: (*Neutron transport theory, Crystallography), (*Crystallography, Neutron transport theory).

BNWL-19 Field 18F
CFSTI Prices: HC$1.00 MF$0.50

Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SUBCRITICAL MEASUREMENTS WITH STORAGE CONTAINERS OF PLUTONIUM NITRATE SOLUTION,
by R. C. Lloyd and E. D. Clayton.
Jan 65, 17p Unclassified report
Contract AT(45-1)-1350

Descriptors: (*Reactor shielding materials, Containment), (*Containment, Reactor shielding materials).

CAPE-1185 Div. 18J

Rocky Flats Plant, Dow Chemical Co., Denver, Colo.
REPROCESSING FACILITY, BUILDING 71.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Reactor fuel processing, Industrial plants), (*Industrial plants, Mechanical drawings), Plutonium, Processing, Chemical engineering.

The expanded reprocessing plutonium purification plant is described along with some of the equipment, including rotary drum filters, glove boxes, process vessels, and piping. The 6 x 18 in. dia rotary drum filters were used in filtering plutonium peroxide solutions following precipitation of insoluble residues from leaching solutions during production purification. Glove box drawings show air locks, windows, glove ports, filters, frames, and sample take-out ports. Processing vessels and piping drawings show both horizontal and vertical tanks, ion exchange columns, vacuum knock-out pots, an evaporator, and a 400 gal chemical make-up waste tank. For details see TID-4100. Includes 34 drawings. (AEC Abstract)

CONF-446-79 Field 18K
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
MEASUREMENTS OF THE DIFFUSION PARAMETERS OF CARBON BLACK,
by E. Starr and J. W. L. Devilliers. 1962, 6p
Unclassified report

Presented at American Nuclear Society 10th Annual Meeting, Philadelphia, June 1964.

Descriptors: (*Carbon black, Neutron transport theory).

CONF-654-25 Field 18I
CFSTI Prices: HC$1.00 MF$0.50

Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.

ANISOTROPIC MIGRATION AREA MEASUREMENTS IN A D20 MODERATED LATTICE OF GAS-COOLED U02 ROD CLUSTERS,
by A. E. Dunklee, W. B. Rogers, and P. A. Lourme.
1963, 18p
Contract AT(07-2)-1

Unclassified report

Presented at 33rd Symposium on Shock, Vibration and Associated Environments, Washington, D. C., Dec 63.

Descriptors: (*Reactor lattice parameters, Power reactors), (*Power reactors, Reactor lattice parameters).

DP-910 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Du Pont De Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
NONDESTRUCTIVE TEST OF CARBON BEDS FOR REACTOR CONTAINMENT APPLICATIONS.
Progress rept., Jan-Mar 64,
by David R. Muhlbaier. Aug 64, 21p
Contract AT(07-2)-1

Unclassified report

Descriptors: (*Containment, Laboratory equipment), (*Carbon, Non-destructive testing).

GA-4022 (pt. 1) Field 18J, 13H
CFSTI Prices: HC$4.00 MF$0.75

General Atomic, San Diego, Calif.
ADVANCED, GRAPHITE-MATRIX, DISPERSION-TYPE FUEL SYSTEMS.
Annual rept. 1 Apr. 62-31 Mar. 63,
by E. E. Anderson, J. O. Gardner, P. E. Gethard and H. K. Lonsdale. 1 May 63, 116p
Contract AT(04-3)-167

Unclassified report

Descriptors: (*Reactor fuels, Graphite), (*Graphite, Material forming).

GEAP-3694 Field 18J
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., Pleasanton, Calif. Vallecitos Atomic Lab.
POST-IRRADIATION EXAMINATION OF ALLIS CHALMERS (NSPR) CAPSULES I, II, AND III,
by J. M. Gerhart. Feb 61, 63p
Contract AT(11-1)-589

Unclassified report

Descriptors: (*Reactor fuel cladding, Radiation damage).

GEAP-3771-14 Field 18J
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
HIGH PERFORMANCE UO2 PROGRAM.
Quarterly progress rept. no. 14, Jul-Sep 64,
ed. by M. F. Lyons and B. Weidenbaum. 15 Oct 64,
76p EURAEC-1236 Unclassified report
Contract AT(04-3)-189

Descriptors: (*Reactor fuels, Uranium compounds), (*Uranium compounds, Dioxides).

GEAP-4535 Field 18J
CFSTI Prices: HC$3.00 MF$1.00

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
CORRELATION OF UO 2 MICROSTRUCTURES FROM IN-PILE AND OUT-OF-PILE EXPERIMENTS,
by R. C. Nelson and H. Hausner. 4 Jun 64, 55p
EURAEC-1321
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Uranium compounds, Dioxides), (*Reactor fuels, Uranium compounds).

GEAP-4598 Field 18K
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
FLARE: A THREE-DIMENSIONAL BOILING WATER REACTOR SIMULATOR,
by D. L. Delp, D. L. Fischer, and J. M. Harriman.
16 Jul 64, 95p
Contract AT(04-3)-361

Unclassified report

Descriptors: (*Boiling water reactors, Simulators).

GEAP-4644 Field 18L
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
DEVELOPMENT OF PULSED NEUTRON APPLICATION TO POWER REACTOR START-UP PROCEDURES.
Quarterly rept. no. 9 and summary, 1 Apr-30 Jun 64,
by P. Meyer and E. Garelis. 22 Sep 64, 43p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Power reactors, Reactor start-up sources).

GEAP-4703 Field 18J
CFSTI Prices: HC$4.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
NUCLEAR SUPERHEAT PROJECT.
Quarterly rept. no. 20, May-Jul 64,
by W. L. Fiock. Aug 64, 102p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuel elements, Heat-resistant metals + alloys).

GEAP-4716 Field 18J
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
ACCURATE NUCLEAR FUEL BURNUP ANALYSIS.
Quarterly progress rept. no. 11, Jun-Aug 64,
by B. F. Rider, J. P. Peterson, Jr., and C. P. Ruiz.
1 Sep 64, 33p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Fuel burn up), (*Fuel burn up, Reactor fuels).

GEAP-4725 Field 18I, 18J
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
FUEL CYCLE PROGRAM. A BOILING WATER REACTOR RESEARCH AND DEVELOPMENT PROGRAM.
Progress rept. no. 16, Jul-Oct 64,
comp. by C. L. Howard. 15 Oct 64, 46p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Boiling water reactors), (*Boiling water reactors, Reactor fuels).

GEAP-4729 Field 18I
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PROGRAM FOR THE DEVELOPMENT OF PLUTONIUM RECYCLE FOR USE IN LIGHT WATE R MODERATOR REACTORS.
Quarterly rept. no. 14, Jul-30 Sep 64,
by M. A. Robkin. Oct 64, 13p EURAEC-1264
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Light water reactors, Plutonium), (*Plutonium, Light water reactors).

GEAP-4730 Field 18J
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PLUTONIUM SUBCRITICAL EXPERIMENT PROGRAM.
Program summary and quarterly rept. no. 1, 1 Jul-30 Sep 64,
by J. G. Carver. 15 Oct 64, 23p EURAEC-1234
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Plutonium, Reactor fuels), (*Reactor fuels, Plutonium).

GEAP-4731 Field 18K
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
TRANSPORT EQUIVALENT DIFFUSION THEORY.
Quarterly progress rept. no. 2, 1 Jul-30 Sep 64,
by G. H. Kear. 9 Oct 64, 17p EURAEC-1265
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Neutron transport theory, Reactor cores), (*Reactor cores, Neutron transport theory).

GEAP-4741 Field 18L
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
HIGH POWER DENSITY DEVELOPMENT PROJECT.
Quarterly progress rept. no. 18, Jul-Sep 64,
comp. by R. L. Holladay. 1 Oct 64, 90p
Contract AT(04-3)-361

Unclassified report

Descriptors: (*Power reactors, Reactor fuel rods), (*Reactor fuel rods, Power reactors).

GEAP-4747 Field 18D
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THEORY OF THE CAMPBELL SYSTEM OF REACTOR INSTRUMENTATION.
Quarterly progress rept., Jul-Sep 64,
by J. P. Neissel. Oct 64, 29p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Radiation measurement systems, Design), (*Nuclear reactors, Instrumentation).

HW-83447 Field 18D
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
PRTR WATER TREATMENT PLANT TURBIDITY MONITORING SYSTEM,
by F. H. Shadel. 10 Sep 64, 48p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Water supplies, Water filters), (*Water pollution, Monitors).

HWS-6574 (Rev 1) Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
SPECIFICATION FOR CONFINEMENT SEALS. 105-N AND 109-N BUILDINGS, PROJECT CAI-816,
by H. F. Jensen and G. E. Wade.
17 Feb 61, 24p
Contract AT(45)-1350

Unclassified report

Descriptors: (*Confinement, Sealing compounds), (*Seals(Stoppers), Containment).

HW-SA-3316 Field 18H, 6C
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
GAMMA EMITTING RADIONUCLIDES IN ALASKAN TUNDRA VEGETATION, 1959, 1960, 1961,
by W. H. Rickard, J. J. Davis, and W. C. Hansen.
10 Jan 64, 17p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Radioactivity, Plants(Botany)), (*Alaska, Radioactive fallout).

HW-SA-3317 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
A DEVICE FOR RECORDING AIR CONCENTRATIONS OF ZINC SULFIDE FLUORESCENT PIGMENT ON A REAL TIME SCALE,
by P. W. Nickola, M. O. Rankin, and M. F. Scoggins.
10 Jan 64, 13p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Radiation monitors, Tracer studies), (*Tracer studies, Radiation monitors).

HW-SA-3416 Field 18L, 21F
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
RADIOISOTOPIC SPACE POWER -- PROSPECTS AND LIMITATIONS,
by E. D. Sayre and C. A. Rohrmann. 13 Mar 64, 23p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Radioactive isotopes, Space propulsion), (*Space propulsion, Power reactors).

HW-SA-3565 Field 18D, 18K
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
PULSED NEUTRON SOURCE MEASUREMENTS AND ANALYSIS OF RANDOM NOISE IN SMALL MULTIPLYING SYSTEMS,
by S. R. Bierman, K. L. Garlid, and R. W. Albrecht.
19 Jun 64, 29p CONF-446-43
Contract AT(54-1)-1350
Unclassified report

Presented at American Nuclear Society 10th annual meeting, Philadelphia, June 1964.

Descriptors: (*Reactor lattice parameters, Test equipment(Electronics), (*Critical assemblies, Reactor lattice parameters).

LA-3109 Field 18D
CFSTI Prices: HC$2.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE DEVELOPMENT OF A DRY INERT ATMOSPHERE DRYBOX SYSTEM,
by Al Zerwekh, William H. Ashley, and Charles F. Metz.
Apr 64, 34p
Contract W-7405-eng-36
Unclassified report

Descriptors: (*Controlled atmospheres, Laboratory equipment).

N65-16588 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SUBNANOSECOND TIME RESOLUTION SINGLE-CHANNEL PULSE-HEIGHT ANALYZER,
by Theodore E. Fessler and William K. Roberts.
Feb 65, 10p NASA-TN-D-2673
Unclassified report

Descriptors: (*Pulse height analyzers, Design), Coincidence counting, Instrumentation.

NAA-SR-9161 Field 18J
CFSTI Prices: HC$2.00 MF$0.50

Atomics International, Canoga Park, Calif.
REPROCESSING OF URANIUM CARBIDE BY A NITRIDE - CARBIDE CYCLE. II. KINETICS OF NITRIDE CONVERSION TO CARBIDE,
by L. A. Hanson. 15 Oct 64, 31p
Unclassified report

Descriptors: (*Uranium compounds, Carbides), (*Uranium compounds, Nitrides).

ORNL-3669 Field 18B, 18N, 10B
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
PREPARATION OF A CESIUM (137 CS) BOROSILICATE GLASS POWER SOURCE,
by C. L. Ottinger, E. E. Pierce, and R. W. Schaich.
Apr 65, 17p
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Auxiliary power plants, Radioactive isotopes), (*Radioactive isotopes, Nuclear industrial applications).

ORNL-3781 Field 18I
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
OPTICAL MAPPING OF OAK RIDGE RESEARCH REACTOR EXPERIMENT TUBES,
by A. A. Abbatiello. Apr 65, 20p
Contract W-7405-ENG-26
Unclassified report

Descriptors: (*Research reactors, Optical analysis), (*Optical instruments, Research reactors).

Patent 3,183,059 Field 18J

PLUTONIUM ADSORPTION AND DESORPTION.
Patent assigned to AEC,
by Andrew E. Reisenauer and Lloyd L. Ames, Jr.
11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Plutonium, Separation), Patents, Absorption(Physical), Processing, Solutions, Calcium compounds, Phosphates, Carbonates, Acids, Minerals.

The method is for adsorbing plutonium from nuclear reactor reprocessing solutions. Florida apatite makes a cheap and efficient adsorbent for the plutonium values even from acidic solutions. These may be desorbed from the apatite by carbonate ion or by strong mineral acid.

Patent 3,183,166 Field 18J

LOW TEMPERATURE GRAPHITE RADIATION DAMAGE REMOVAL.
Patent assigned to AEC,
by Donald G. Schweitzer, Robert M. Singer, and David H. Gurinsky. 11 May 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Graphite, Radiation damage), (*Heat treatment, Graphite), Reactor moderators, Gas-cooled reactors, Stabilization, Decontamination, Patents.

The method is useful in stabilizing and removing radiation damage and its associated dimensional growth from nuclear reactor graphite exposed to radiation in nuclear reactors. The method involves low temperature annealing above the irradiation temperature and also alternate frequent short irradiations.

Patent 3,188,278 Field 18J, 18L

FUEL ELEMENT FOR A SUPERCRITICAL PRESSURE POWER REACTOR.
Patent assigned to AEC,
by Harold Harty, James J. Regimbal, Kadzuhisa G. Toyoda and Richard D. Widrig. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Reactor fuel elements, Power reactors), Pressurized water reactors, Reactor coolants, Barometric pressure, Reactor control, Patents.

The fuel element is for use in a direct-cycle, water cooled, supercritical-pressure power nuclear reactor. The resistor incorporates a plurality of internally cooled fuel elements submerged in a pool of water at atmospheric pressure. Cooling water is passed through pressure tubes in the fuel elements at supercritical pressure and temperature. The reactor is controlled by honeycomb-shaped control elements which enclose and interpenetrate a cluster of the fuel elements thereby serving to protect the reactor against rupture of a pressure tube.

Patent 3,188,446 Field 18J

METHOD AND APPARATUS FOR ASSEMBLY OF NUCLEAR CONTROL RODS AND FUEL TUBES.
Patent assigned to AEC,
by William E. Ray and George R. Davis. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Welding, Reactor fuel processing), (*Reactor fuel processing, Encapsulation), (*Control rods, Welding), Reactor control, Reactor cores, Patents.

The process is for encapsulating nuclear control materials or nuclear fuels by welding. The container casing is preheated in the open area to be sealed, sealing the container by inserting a closely fitting plug into the preheated, expanded open area, and then sealing the plug to the container by welding. Apparatus is shown.

Patent 3,188,470 Field 18I

METHOD OF DETERMINING THE NEGATIVE REACTIVITY OF NEUTRONIC MULTIPLYING SYSTEMS.
Patent assigned to AEC,
by Charles W. Ricker, Alain L. Colomb and Estle R. Mann. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Reactor reactivity, Measurement), (*Multiplication factor, Neutrons), Reactor shutdown, Ionization chambers, Reactor control, Subcritical assemblies, Patents.

A method of measuring the negative reactivity (shutdown margin) of a reactor in a subcritical condition is provided. Several neutron fluctuation spectral densities are measured simultaneously at fixed frequency intervals and the amplitudes thereof are used as input to a meter or computer which reads out directly the value of the negative reactivity.

RFP-442 Field 18G, 18F
CFSTI Prices: HC$1.00 MF$0.50

Rocky Flats Div., Dow Chemical Co., Golden, Colo.
RECOVERY AND PRELIMINARY PURIFICATION OF AMERICIUM OBTAINED FROM WASTE MATERIAL,
by P. G. Hagan and H. W. Miller. 29 Mar 65, 11p
Contract AT(29-1)-1106
Unclassified report

Descriptors: (*Americium, Purification), (*Radioactive waste, Decontamination).

UCRL-11620 Field 18D
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
MAGNETOSTRICTIVE READOUT FOR WIRE SPARK CHAMBERS,
by Victor Perez-Mendez and James M. Pfab.
21 Aug 64, 19p N64-33086
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Radiation measurement systems, Magnetostriction).

UCRL-11946 Field 18D
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
MOUNTINGS AND HOUSINGS FOR LITHIUM-DRIFTED SILICON AND GERMANIUM DETECTORS,
by C. Eugene Miner. 24 Feb 65, 41p
Contract W-7405-ENG-48
Unclassified report

Descriptors: (*Structural parts, Radiation measurement systems), (*Radiation measurement systems, Structural parts).

UCRL-12408 Field 18K
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
THE POPULATIONS OF BOUND STATES OF HYDROGENIC IONS IN A STEADY STATE WITH NONTHERMODYNAMIC EQUILIBRIUM,
by William H. Grasberger. Feb 65, 26p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Hydrogen, Reactor kinetics), (*Reactor kinetics, Population(Mathematics).

WCAP-3736 (vol 2) Field 18J
CFSTI Prices: HC$7.00 MF$2.75

Westinghouse Electric Corp., Pittsburgh, Pa.
Atomic Power Div.
DNB (BURNOUT) STUDIES IN AN OPEN LATTICE CORE. VOLUME II,
by L. S. Tong, H. B. Currin and F. C. Engel.
Aug 64, 317p
Contract AT(30-1)-3064
Unclassified report

Descriptors: (*Reactor cores, Reactor lattice parameters).

19. Ordnance

Patent 3,182,555 Field 19F

FEED MECHANISM FOR EXTERNALLY POWERED AUTOMATIC GUN.
Patent assigned to Army,
by John G. Rocha. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Feed mechanisms, Automatic weapons), (*Automatic weapons, Feed mechanisms), Guns, Design, Patents.

The feed mechanism is for a motor driven automatic gun of the type wherein each round is chambered during rearward movement of the barrel into firing position. A belt of linked cartridges is used for feeding the cartridges in the gun. Cartridges are intermittently fed into chambering position in direct synchronization with the rate at which the barrel is reciprocated into and out of firing position.

Patent 3,182,556 Field 19F

DISINTEGRATING CARTRIDGE BELT LINK AND CONNECTOR THEREFOR.
Patent assigned to Army,
by John G. Rocha. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Feed mechanisms, Ammunition belt links), (*Ammunition belt links, Automatic weapons), Guns, Cartridges, Design, Patents.

The linked cartridge belt is for use with an automatic gun. Disintegration of the belt is effected by the breech closing movement of the barrel of the gun. The belt remains in continuous engagement with the cartridge without interference with its chambering by the barrel.

Patent 3,182,594 Field 19A

TEMPERATURE INDEPENDENT TIMING DEVICE, DASHPOT TYPE.
Patent assigned to Army,
by Wilbur Harris and Harry M. Day. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Timing devices, Fuzes(Ordnance)), Delay elements(Explosive), Time-delay fuzes, Patents.

A dash-pot is used in the fuse as a time delay unit. A cylinder is moved by a constant source of pressure such as a spring. The cylinder moves only as fast as a fluid can flow through a clearance between the position head and the interior of the cylinder wall. The piston head is made of a coiled flat bi-metallic strip forming an expandable periphery varied by temperature changes.

Patent 3,182,595 Field 19A

IGNITER ASSEMBLY CONTAINING STRANDS OF BENITE.
Patent assigned to Army,
by Harry F. Hassmann. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Igniters, Antitank ammunition), (*Antitank ammunition, Igniters), High-explosive ammunition, Fin-stabilized ammunition, Hypervelocity projectiles, Nitrocellulose, Sulfur, Charcoal, Potassium compounds, Nitrates, Amines, Organic nitrogen compounds, Patents.

The igniter assembly is for use in high velocity ammunition such as finned antitank projectiles. Strands of Benite are utilized in the igniter structure. The use of strands permits a flow of combustion gases in the igniter tube. The Benite includes nitrocellulose, potassium nitrate, sulfur, charcoal and a stabilizer such as nitrodiphenylamine.

Patent 3,182,741 Field 19C

ON-ROAD, OFF-ROAD TRACK CARRYING VEHICLE.
Patent assigned to Army,
by Charles D. Roach. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Tracked vehicles, Maneuverability), (*Vehicle tracks, Trafficability), Military requirements, Armed forces transportation, Hydraulic actuators, Configuration, Ordnance, Patents.

The track assemblies for a track supported vehicle include hydraulically actuated mechanisms effective to change the shape of the track from a rectangular to a triangular shape. The shape of the tracks can be changed while the vehicle is moving. The structure is particularly applicable to troop carriers, weapon carriers and ambulances and for travel over swampy or sandy terrain.

Patent 3,182,987 Field 19H

VIBRATION AND NOISE CONTROL IN LIQUID SPRINGS.
Patent assigned to Navy,
by Wilson T. Price and Charles R. Brown.
11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Guided missile launchers, Vibration isolators), (*Vibration isolators, Liquids), (*Springs, Liquids), Submarines, Underwater ordnance, Noise, Control systems, Hydraulic actuators, Patents.

The liquid spring is part of a missile launching system mounted on a submarine. The liquid springs are designed to attenuate vibrations being transferred to a missile from its launcher. The springs are hydraulically actuated. Knitted steel wire material or rubber impregnated canvas material may be used as an attenuating material.

Patent 3,183,132 Field 19A

METHOD OF DELAYING THE IGNITION OF WHITE PHOSPHORUS INCENDIARY COMPOSITIONS.
Patent assigned to Army,
by Seymour M. Kaye. 11 May 65

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*White phosphorus, Ignition lag), (*Incendiary mixtures, Ignition), Kerosene, Solvent, Solution, Patents.

The ignition of an incendiary material is delayed by using a solution of white phosphorus as solute in a mixture of carbon disulfide and kerosene as solvent. The solution may be applied to combustible materials. Lag time is varied by the amount of kerosene used.

Patent 3,183,616 Field 19F

SELECTIVE ONE AND TWO-STAGE TRIGGER MECHANISM FOR FIREARMS.
Patent assigned to Army,
by Warren L. Gandy. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Firing mechanisms(Weapon), Patents), (*Small arms, Firing mechanisms(Weapon)), Operation, Multiple operation, Control, Pressure.

The trigger mechanisms are for rifles with reciprocal bolts which carry a spring-biased firing pin. The mechanisms are designed especially for marksmanship use. A one-stage operation is utilized in which the firing pin sear is directly controlled by the trigger. An arrangement is provided in the two stage operation for finely adjusting the pressure required to actuate the trigger.

Patent 3,183,739 Field 19E, 13I

INDEXING DEVICE.
Patent assigned to Air Force,
by Z. Ted Rajewski and Robert W. Navarro. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Positioning devices(Machinery), Gears), Calibration, Corrections, Disks.

The indexing device is used to position the input driven gear trains for driving units found in scanners such as radar, fire control systems, monitoring systems and computing systems. The indexing device positions the gear train to a reference position. It is readily mountable on currently-designed geared mechanisms with a minimum or no change to the geared mechanism.

Patent 3,183,777 Field 19A, 13E

CONNECTOR ALIGNING DEVICE.
Patent assigned to Navy,
by Carl A. Damm. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Positioning devices(Machinery), Disconnect fittings), (*Disconnect fittings, Positioning devices), Patents, Design, Couplings, Handling, Dollies, Bomb handling vehicles, Bombs, Bomb hoists.

The weapons stowage, handling, suspension and release system utilizes a coupling system, including a self-aligning device which permits the coupling of two mating units for transferring a bomb or torpedo from one place to another in an aircraft rearming system. The connector aligning device may also be used in helicopter airlift systems. The self-aligning device permits the coupling of two mating units and may be selectively retained on either the male or female portion.

Patent 3,183,835 Field 19A

MINE CLEARING SNAKE.
Patent assigned to Army,
by James L. Bisch. 18 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Demolitions, Mine clearance), (*Mine clearance, Demolitions), Rocket propulsion, Patents, Containers, Steel, Minefields, Land mines.

The snake demolition torpedo comprises an elongated container composed of interconnected segments formed of either longitudinally bent strips of steel or long steel tubes which serve as retaining housings for demolition cartridges. The torpedo is packed in a receptacle to the place of use and propelled from the assembly station by a rocket motor into operative position on the mine field to be detonated where the demolition cartridges are detonated.

Patent 3,185,037 Field 19G

DEVICE FOR PROVIDING SPIN ROCKET PRE-RELEASE DWELL TIME.
Patent assigned to Air Force,
by David L. Hammond. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Spin-stabilized ammunition, Rockets), (*Rocket launchers, Release mechanisms), Acceleration, Time, Patents.

A releasable restraining device is mounted in the base of a launching tube for retaining an ignited spin type rocket until it has accelerated to an aerodynamically stable spin rate prior to launching. A spring collet secured in the base of the launching tube is in engagement with a locking device on the base of the rotating rocket until a cam nut mounted on a threaded stud extending from the rocket base moves into engagement with the spring collet to release the rocket for launching.

Patent 3,185,726 Field 19A, 21I

NEW METHOD FOR THE PREPARATION OF HIGH ENERGY FUEL.
Patent assigned to Army,
by Jean P. Picard and Hans Walter. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Propellants, Preparation), (*Nitrates, Explosive materials), (*Explosive materials, Synthesis-(Chemistry)), Manufacturing methods, Ammunition propellants, Rocket propellants, Gas generators, Binders, Patents.

The high energy fuels are useful as propellants in guns, rocket motors, and gas generators. Some of the products may be used as binders in the manufacture of explosive pellets. The explosive compound trimethylolnitromethane trinitrate is modified by replacing one or more of its nitro radicals with organic substituents.

Patent 3,187,632 Field 19F

PROJECTILE DISPERSION DEVICE FOR FIREARMS.
Patent assigned to Army,
by Earle M. Harvey. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Projectiles, Scattering), (*Gun barrel attachments, Scattering), Small arms, Automatic weapons, Patents.

The projectile dispersion device is used with an automatic firearm having a barrel with rifled bores. The device is attached to the barrel of the firearm and deflects the projectiles from cartridges exploded therein from bore alignment at exit to produce a dispersion shot pattern at the target.

Patent 3,187,671 Field 19A, 19F

PRIMER FOR CONSUMABLE ROUND.
Patent assigned to Army,
by Joseph Quinlan, John J. Scanlon, and
Earl F. Van Artsdalen. 8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Small arms ammunition, Primers), (*Primers, Small arms ammunition), Small arms, Patents.

The primer is for ammunition used in light weight small arms, for example, with a 30 caliber consumable round having a consumable case rear end portion. An explosive cap of the type used in toy pistols is placed in the rear of the primer mix and both the primer and the rear topping charge may be wrapped together or separately in a thin paper envelope or an adhesive may be used for the topping charge.

20. Physics

AD-266 648 Field 20K
CFSTI Prices: HC$1.00

Mathematics Research Center, Univ. of Wisconsin, Madison.
ASYMPTOTIC PHENOMENON IN LARGE TORSION,
by B. R. Seth. Sep 61, 20p
Technical summary rept. MRC-TSR-264
Contract DA11 022ORD2059
Unclassified report

Descriptors: (*Stresses, Deformation), (*Elasticity, Deformation), Thermal conductivity, Electrical conductance, Wire, Copper, Aluminum, Steel, Shear stresses, Differential equations.

The asymptotic treatment of the finite torsion problem provides one of the few examples in which a plastic state resulting from large deformation is predicted by the elastic theory. (Author)

AD-271 881 Field 20M, 20F
CFSTI Price: HC$1.00

Air Force Cambridge Research Labs., Bedford, Mass.
THE ELLIPSOIDAL THERMAL IMAGER,
by N. Stone, G. P. Ploetz, and H. Cox. Oct 61, 12p
AFCRL-916
Proj. 4619, Task 46190
Unclassified report

Descriptors: (*Thermal radiation, Focusing), (*Images, Thermal radiation), (*Optics, Thermal radiation), Ellipsoids, Mirrors, Reflectors.

A novel thermal imaging device is described. The two halves of an allipsoid split on a plane containing its major axis can be arranged to image two sources on a common volume. Thermal energy from point sources are imaged with a single reflection and with a 180 degrees collection angle. (Author)

AD-289 473 Field 20N, 20I
CFSTI Price: HC$2.00

Advanced Kinetics, Inc., Santa Ana, Calif.
PRODUCTION OF MILLIMETER AND SUB-MILLIMETER ELECTROMAGNETIC WAVES BY THE INTERACTION OF PLASMA AND ELECTRON BEAMS WITH HIGH INTENSITY PULSED MAGNETS.
Quarterly scientific rept. no. 7, 15 Jan-15 Apr 62,
by Ralph W. Waniek. 15 Apr 62, 36p
Contract AF19 604 7406 Unclassified report
N62 13149
See also PB-154 563.

Descriptors: (*Millimeter waves, Plasma physics), (*Plasma physics, Millimeter waves), Electron beams, Magnetic fields, Charged particles, Injection, Deceleration, Bremsstrahlung, Electromagnetic waves, Production, Oscillators.

The recent development of strong pulsed magnetic fields in the megagauss region has made possible a number of interesting applications to the control of charged particle motion, such as coherent electromagnetic radiation production and momentum selection of high energy charged particles. Many of these applications involve the introduction of a beam or bunch of particles into a pre-existing magnetic field. One of the central problems in such work is the choice of beam injection parameters which will optimize the desired behavior of the particles in the field. This paper is concerned with the zeroth order delineation of those ranges of injection parameters for a particular type of field configuration which will allow the particles to attain regions of high magnetic field strength.

AD-294 022 Field 20C, 9C
CFSTI Prices: HC$2.00

Battelle Memorial Inst., Columbus, Ohio.
HIGH-VOLTAGE BREAKDOWN IN VACUUM AND IN OIL,
by L. H. Bettenhausen. 10 Oct 62, 33p
Rept. no. BMI-197-12-1
Contract SD80, ARPA Order 197
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Electric discharges, Reviews), (*Vacuum, Electric discharges), (*Oils, Electric discharges), (*Electric insulation, Electric discharges), Electron tubes, Dielectrics, Electrodes, Bibliographies.

A summary is given of the state of knowledge and current research into high-voltage breakdown in vacuum and in oil. It is directed toward engineers who will use vacuum and oil as electrical-insulation media. The nature of the breakdown phenomena in vacuum is discussed first. Current research into vacuum breakdown is then considered. A description of the breakdown phenomena in liquid dielectrics is the next topic, with emphasis on the behavior of insulating oils. The appendix lists references to a portion of the vacuum-breakdown literature selected to serve as a reader's guide. A very limited bibliography of the literature on high-voltage breakdown in oil is also included in the appendix. (Author)

CEAL-1015 Field 20G
CFSTI Prices: HC$1.00 MF$0.50

Cambridge Electron Accelerator, Mass.
A PRECISION ENERGY CALIBRATION FOR THE CAMBRIDGE ELECTRON ACCELERATOR,
by Herman Winick. 1 Mar 65, 25p
Contract AT(30-1)-2076

Unclassified report

Descriptors: (*Particle accelerators, Calibration), (*Electron beams, Synchrotrons).

EURAEC-1087 Field 20D
CFSTI Prices: HC$3.00 MF$0.75

Centro Informazioni Studi Esperienze, Milan (Italy).
FURTHER INVESTIGATION ON TWO-PHASE ADIABATIC ANNULAR-DISPERSED FLOW EFFECT OF LENGTH AND OF SOME INLET CONDITIONS ON FLOW PARAMETERS,
Topical rept. no. 14,
by L. Cravarolo, A. Hassid, and E. Pedrocchi.
Sep 64, 93p CISE-R-93
Contract 060-61-7-RDI

Unclassified report

Descriptors: (*Adiabatic gas flow, Hydrodynamic configurations).

GEAP-4727 Field 20M
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
TRANSITION BOILING HEAT TRANSFER PROGRAM.
Quarterly progress rept. no. 7, Jul-Sep 64,
by E. P. Quinn. 1 Oct 64, 27p EURAEC-1244
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Heat transfer, Transition temperature), (*Film boiling, Heat transfer).

GEAP-4733 Field 20M, 20D
CFSTI Prices: HC$2.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
A PROGRAM OF TWO-PHASE FLOW INVESTIGATION.
Quarterly rept. no. 6, Jul-Sep 64,
by F. W. Staub and N. Zuber. 14 Oct 64, 60p
EURAEC-1235
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Fluid flow, Heat transfer), (*Heat transfer, Fluid flow).

HW-SA-3353 Field 20B
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
WAFERING OF BULK SPECIMENS FOR TRANSMISSION ELECTRON MICROSCOPY,
by B. Mastel and H. E. Kissinger. 6 Feb 64, 6p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Crystal lattice defects, Electron microscopy), (*Metals, Crystal lattice defects).

N65-14850 Field 20H
CFSTI Prices: HC$4.00 MF$0.75

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
COSMIC RAY COLLISIONS IN SPACE PART II - HIGH ENERGY GAMMA RAYS FROM COSMIC RAY COLLISIONS IN SPACE,
by M. Lieber, S. N. Milford, and M. S. Spergel.
Jan 65, 105p
Contract NASw699
NASA CR-149

Unclassified report

Descriptors: (*Cosmic rays, Gamma emission), (*Gamma emission, Interstellar matter), Proton scattering.

N65-16587 Field 20K
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
INVESTIGATION OF THE ELASTIC-PLASTIC STRESS STATE AROUND A REINFORCED OPENING IN A SPHERICAL SHELL,
by Albert Kaufman and David A. Spera. Feb 65, 24p NASA-TN-D-2672

Unclassified report

Descriptors: (*Pressure vessels, Stresses), (*Hemispherical shells, Stresses).

N65-16883 Field 20D
CFSTI Prices: HC$1.00 MF$0.50

Miami Univ., Coral Gables, Fla.
INSTABILITIES IN THE FLOW OF BOILING LIQUID,
by A. H. Stenning and T. N. Veziroglu. Feb 65, 17p
Grant NsG424
NASA CR-164

Unclassified report

Descriptors: (*Boiling, Fluid flow), (*Fluid flow, Stability).

N65-16888 Field 20M, 20I
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.

BRAYTON CYCLE MAGNETOHYDRODYNAMIC POWER GENERATION WITH NONEQUILIBRIUM CONDUCTIVITY,
by John E. Heighway and Lester D. Nichols.
Feb 65, 47p NASA-TN-D-2651

Unclassified report

Descriptors: (*Brayton cycle, Magnetohydrodynamics), (*Magnetohydrodynamics, Generators), Nonequilibrium flow.

N65-17127 Field 20C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
FOUR-DIMENSIONAL DERIVATION OF THE ELECTRODYNAMIC JUMP CONDITIONS, TRACTIONS, AND POWER TRANSFER AT A MOVING BOUNDRY,
by Robert C. Costen. Feb 65, 37p
NASA-TN-D-2618

Unclassified report

Descriptors: (*Field theory, Boundary value problems), (*Electromagnetism, Field theory).

N65-20877 Field 20A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
COMPARISON OF MEASURED AND CALCULATED SONIC-BOOM GROUND PATTERNS DUE TO SEVERAL DIFFERENT AIRCRAFT MANEUVERS,
by Donald L. Lansing and Domenic J. Maglieri.
Apr 65, 33p NASA-TN-D-2730

Unclassified report

Descriptors: (*Sonic boom, Aeronautics), (*Acoustics, Sonic boom).

NAA-SR-9260 Field 20B
CFSTI Prices: HC$1.00 MF$0.50

Atomics International, Canoga Park, Calif.
CRYSTALLOGRAPHIC EXPANSION OF BeO AT THE ALPHA-BETA BeO TRANSFORMATION TEMPERATURE,
by S. B. Austerman. 15 Oct 64, 9p
N65-10596
Contract AT(11-1)-GEN-8

Unclassified report

Descriptors: (*Beryllium compounds, Oxides), (*Crystal structure, High-temperature research).

NCH-100 021 Field 20F, 7D, 11F

National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
PREPARATION OF NBS COPPER-BASE SPECTRO-CHEMICAL STANDARDS.
Standard Reference Materials,
by Robert E. Michaelis, LeRoy L. Wyman, and Richard Flitsch. 15 Oct 64, 45p
NBS mp-260-2

Unclassified report

Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.35, as C-13.10:260-2.

Descriptors: (*Spectroscopy, Standards), (*Copper alloys, Spectroscopy), (*Standards, Preparation), Castings, Material forming, Cooling, Spectrum analyzers, Calibration, X-ray spectroscopy.

A procedure was developed for the preparation of copper alloys in both the chill-cast and wrought forms, sufficiently uniform in composition and microstructure for calibration and use as standard samples in spectrochemical analysis. The method involves casting the molten metal on a massive water-cooled copper plate producing unidirectional cooling. A large disk casting 27 in. in diameter and about 4 in. high is obtained which is split laterally into two pieces, the lower section providing standards in the chill-cast condition and the upper section material for subsequent fabrication into standards for the wrought condition. Details of the planning, preparation and testing of the standards material for 21 compositions are given, and application of the samples in calibration for optical and x-ray spectrochemical analysis is described. (Author)

ORNL-3575 Field 20C, 9B, 12A
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
AN ELLIPTIC INTEGRAL COMPUTER PACKAGE FOR MAGNETIC FIELDS, FORCES, AND MUTUAL INDUCTANCES OF AXISYMMETRIC SYSTEMS, AND A VERSATILE LINE-TRACING ROUTINE,
by M. W. Garrett. Apr 65, 29p
Contract W-7405-ENG-26

Unclassified report

Descriptors: (*Magnetism, Mathematical programming), (*Mathematical programming, Computers).

ORNL-3738 Field 20H
CFSTI Prices: HC$3.00 MF$0.75

Oak Ridge National Lab., Tenn.
MEASUREMENT OF ALPHA, THE RATIO OF THE NEUTRON CAPTURE CROSS SECTION TO THE FISSION CROSS SECTION, FOR 235 U IN THE ENERGY REGION FROM 3.25 EV TO 1.8 KEV,
by G. Desaussure, L. W. Weston and R. Gwin.
Apr 65, 72p
Contract W-7405-ENG-26

Unclassified report

Descriptors: (*Neutron capture, Uranium), (*Uranium, Nuetron cross sections).

ORNL-3755 Field 20K
CFSTI Prices: HC$3.00 MF$0.50

Oak Ridge National Lab., Tenn.
ANALYSIS OF AXISYMMETRICALLY LOADED CYLINDER-TO-SPHERE ATTACHMENTS,
by F. J. Witt and B. L. Greenstreet.
Apr 65, 52p
Contract W-7405-ENG-26

Unclassified report

Descriptors: (*Pressure vessels, Stresses), (*Stresses, Mathematical analysis).

Patent 3,183,390 Field 20F

PHOTOMULTIPLIER.
Patent assigned to AEC,
by Roderick J. Grader and Minoru Paul Nakada.
11 May 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Photomultipliers, X rays), Electrons, Photons, Gain, Detectors, Patents.

The high gain electron multiplier and photo-detector is selectively sensitive to intermediate and high energy photons, such as X-rays. The device is useful in outer space applications. The photomultiplier photon sensitive detector includes an electron multiplier assembly of dynodes enclosed within an evacuated envelope.

Patent 3,183,434 Field 20B

UNIVERSAL ROTATION METHOD AND APPARATUS FOR LOCATING AXES IN SINGLE SPHERICAL FERRIMAGNETIC CRYSTALS.
Patent assigned to Army,
by Martin F. Auer. 11 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Symmetry(Crystallography), Determination), (*Metallic crystals, Symmetry(Crystallography)), Ferromagnetic materials, Single crystals, Crystal structure, Electromagnets, Mercury, Patents.

A technique is disclosed for locating and marking the position of the useful crystallographic axes in ferrimagnetic spheres. The crystal is floated upon the surface of a liquid. The basic elements used include a container of mercury positioned between the poles of an electromagnet and a marking needle for indicating the position of a located axis.

Patent 3,188,473 Field 20F

BLACK INFRARED RADIATION DETECTOR STANDARD.
Patent assigned to Navy,
by Richard L. Bates and Wesley L. Eisenman.
8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Infrared detectors, Calibration), Patents, Conical bodies, Thermocouple, Graphite, Optical coating, Infrared optical materials, Calorimeters, Standards.

The black detector is used as a standard for the spectral calibration of long-wavelength infrared detectors. The detector is in the form of a hollow thin-wall cone of electric and heat conductive material coated with a material having absorption characteristics, a thermocouple junction attached to the cone and the other ends of the two wires of the thermocouple being electrically fastened to electrode supports. Colloidal graphite is used to coat the cone.

PB-167 701 Field 20K
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
SOME CHARACTERISTIC POINTS OF THE CROSS-SECTIONS OF ANISOTROPIC BEAMS,
by J. Nowinski. Feb 59, 27p
Technical summary rept. no. MRC-TSR-72
Contract DA11 022ORD2059
AD 213 461
Unclassified report

Descriptors: (*Beams(Structural), Deflection), Loading(Mechanics), Torque, Prismatic bodies.

PB-167 724 Field 20K, 12A
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
ON DAMPED FREE OSCILLATIONS,
by Oswald Wyler. Jul 58, 31p
Technical summary rept. MRC-TSR-32
Contract DA11 022ORD2059
AD 203 841
Unclassified report

Descriptors: (*Damping, Oscillation), (*Differential equations, Oscillation), Geometry.

PB-167 729 Field 20K
CFSTI Prices: HC$3.00 MF$0.75

Michigan Univ., Ann Arbor.
A THEORETICAL STUDY OF TWO BUCKLING CRITERIA FOR THIN SHELLS.
Doctoral thesis,
by Charles P. Rubin. Oct 63, 66p Unclassified report
Grant NSF G14475E
Descriptors: (*Structural shells, Buckling(Mechanics)), Stresses, Loading(Mechanics), Energy, Differential equations, Compressive properties, Cylindrical bodies, Numerical analysis, Potential theory.

'Lower buckling load' and 'energy load' are considered. A method of approximation is developed for convergence to the 'energy load' from below; the method is applied to a cylindrical shell subjected to axial compression.

PB-167 798 Field 20J, 20H
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley. Dept. of Mathematics.
CROSSING SYMMETRY IN QUANTUM FIELD THEORY,
by P. N. Burgoyne. Feb 62, 12p Unclassified report
Grant NSF GP2
Descriptors: (*Quantum mechanics, Field theory), (*Nuclear reactions, Quantum mechanics), Relativity theory, S-matrix, Pair production, Compton scattering, Annihilation reactions.

A brief and elementary discussion of crossing symmetry is given. This topic is important both from a theoretical and a practical point of view. Together with Lorentz-invariance, unitarity and analyticity it gives a foundation on which to develop a relativistic theory of the S-matrix. At a practical level it is crossing-symmetry which tells one how to compute the scattering amplitude on the important 'unphysical cuts'. Crossing symmetry is explained by discussing a number of examples. In the second section a justification for crossing symmetry is outlined starting from a certain axiomatization of quantum field theory.

PB-167 804 Field 20I
CFSTI Prices: HC$2.00 MF$0.50

Microwave Lab., Stanford Univ., Calif.
CYCLOGRON HARMONIC AMPLIFICATION IN BEAMS AND PLASMAS.

Technical rept.,
by F. W. Crawford and G. S. Kino. Aug 64, 42p
Rept. no. ML-1204 Unclassified report
Grant NSF GP936

Descriptors: (*Cyclotron resonance phenomena, Electron beams), (*Electron beams, Cyclotron resonance phenomena), (*Plasma medium, Cyclotron resonance phenomena), (*Cyclotron waves, Plasma medium), Particle trajectories, Electron guns, Crossed field devices, Doppler effect.

Wave phenomena are discussed in electron beams and plasmas with internal motions, in the presence of a static magnetic field. It is known that axially-rotating beams show wave propagation when the Doppler-shifted frequency seen by the beam electrons is approximately a harmonic of the electron cyclotron frequency. Similar propagation in an infinite series of coupled modes is shown to occur for beams and plasmas in which the electrons gyrate about the magnetic field lines, rather than the axis. A formalism for deriving dispersion relations from a consideration of the individual particle trajectories is presented. Associated with each Doppler-shifted cyclotron harmonic there is found to be a slow and a fast space charge wave propagated along an electron beam. These sets of waves can interact with each other, with slow or fast wave circuits, or with a plasma, to yield growing waves. This mechanism of wave amplification along an unneutralised electron beam may provide an explanation of the noise growth observed in electron beams from shielded guns, and in crossed field devices. (Author)

PB-167 873 Field 20N, 20I, 9A
CFSTI Prices: HC$5.00 MF$1.00

Utah Univ., Salt Lake City. Microwave Device and Electronics Lab.
A STUDY OF ELECTROMAGNETIC WAVES IN A CIRCULAR PLASMA COLUMN.
Technical rept.,
by Paul O. Berrett and Curtis C. Johnson. May 65, 171p
Grants NSF G15017, NSF GP843 Unclassified report
NSF 8

Descriptors: (*Electromagnetic waves, Plasma medium), (*Plasma medium, Electromagnetic waves), Cesium, Mercury, Equations, Mathematical models, Programming(Computers), Waveguides, Electrical impedance, Ionization, Boundary layer, Electron beams.

Electromagnetic waves in a circular plasma column with axial static magnetic field are investigated. The analytic approach to find the mode solutions treats the plasma as a medium having a tensor permittivity and introduces the boundary conditions as impedances at the column's lateral surface. It is found that, in general, the modes are hybrid and the usual separation into transverse electric and transverse magnetic modes is not possible. Solutions are found by solving the determinantal equation by numerical methods on a high-speed digital computer. Experimental measurements on a thermally generated cesium plasma column and on a mercury discharge plasma column are reported. (Author)

21. Propulsion and Fuels

AD-297 457 Field 21B, 14B, 11I
CFSTI Prices: HC$4.00

United States Testing Co., Inc., Hoboken, N. J.
PROCEDURES AND ANALYTICAL METHODS FOR DETERMINING TOXIC GASES PRODUCED BY SYNTHETIC MATERIALS. PROCEDURES FOR FLASH IGNITION AND SELF-IGNITION TEMPERATURE DETERMINATIONS.
1963, 101p
Contract NObs84814, Proj. S R007 03 04
Unclassified report

Rept. of Test no. 83413.
Available copy will not permit fully legible reproduction.

Descriptors: (*Heat-resistant plastics, Ignition), (*Poisonous gases, Gas analysis), (*Gas analysis, Instrumentation), Flammability, Test equipment, Combustion products, Temperature, Pyrolysis, Combustion, Chlorine, Hydrochloric acid, Phosgene, Formaldehyde, Ammonia, Carbon compounds, Monoxides, Carbon dioxide, Nitrogen compounds, Dioxides, Hydrogen compounds, Cyanides.

Equipment, procedures and analytical methods for determining the nature and concentration of toxic gases produced when synthetic materials are subjected to flammability tests are described. A method for flash-ignition temperature determination is given. The necessary equipment and a procedure for determining the self-ignition temperature of heat resistant material is described. (Author)

GEAP-318 Field 21F
CFSTI Prices: HC$3.00 MF$0.50

General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
630A MARITIME NUCLEAR STEAM GENERATOR.
Progress rept. no. 11.
30 Oct 64, 85p
Contract AT40-1-2847
Unclassified report

Descriptors: (*Marine nuclear propulsion, Nuclear powered vessels), (*Nuclear-powered vessels, Marine nuclear propulsion).

GEAP-3375 (Rev 1) Field 21F
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM. ANALYSIS OF PARTICULAR MECHANICAL CHARACTERISTICS OF THE CORE II FUEL ASSEMBLY,
by R. G. Cochran. 9 Jan 61, 38p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Marine nuclear propulsion, Nuclear powered vessels), (*Nuclear-powered vessels, Marine nuclear propulsion).

N65-17464 Field 21H
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
ANALYSIS OF TURBOPUMP FEED SYSTEMS FOR HYDROGEN-NUCLEAR ROCKETS,
by Warren J. Whitney. Mar 65, 17p
NASA-TN-D-2712
Unclassified report

Descriptors: (*Turbopumps, Engine fuel systems components), (*Rocket motors, Turbopumps).

N65-20482 Field 21E, 1B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SUMMARY OF V-G DATA OBTAINED FROM TURBINE-POWERED TRANSPORT AIRPLANES FROM 1959 to 1963, by Walter G. Walker. Apr 65, 19p
NASA-TN-D-2740

Unclassified report

Descriptors: (*Turbojet engines, Transport planes), (*Transport planes, Turbojet engines).

N65-22369 Field 21I, 1A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
PARAMETRIC INVESTIGATION OF LIQUID HYDROGEN TANK PRESSURIZATION DURING OUTFLOW, by David A. Mandell and William H. Roudebush. Apr 65, 28p NASA-TN-D-2797

Unclassified report

Descriptors: (*Fuel tanks, Pressure), (*Liquefied gases, Gas flow).

N65-23168 Field 21E
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
USE OF ARBITRARY QUASI-ORTHOGONALS FOR CALCULATING FLOW DISTRIBUTION ON A BLADE-TO-BLADE SURFACE IN A TURBOMACHINE, by Theodore Katsanis. May 65, 34p
NASA-TN-D-2809

Unclassified report

Descriptors: (*Turbine blades, Fluid flow), Axial-flow turbines, Mathematical analysis.

Patent 3,183,664 Field 21H

VARIABLE-AREA ROCKET NOZZLE.
Patent assigned to Army,
by Louis V. Divone. 18 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Rocket motor nozzles, Controllable-thrust rocket motors), Patents, Thrust, Rocket motors-(Solid propellant), Control systems.

The thrust and therefore the range of a solid propellant rocket missile is varied by expansion and contraction of the divergent portion of the missile nozzle. A thirty percent variation in thrust can be obtained by varying the area-ratio of the nozzle. A further control effect is obtained by venting the divergent section of the nozzle.

Patent 3,184,352 Field 21I

SOLVENT PROCESS FOR PREPARING EPOXY-BASE PROPELLANTS.
Patent assigned to Army,
by Walter S. Baker. 18 May 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Solid rocket propellant binders, Epoxy plastics), (*Solid rocket oxidizers, Epoxy plastics), (*Epoxy plastics, Solid rocket propellant binders), Burning rate, stabilization, Processing, Solvents, Physical properties, Strength, Patents.

The propellant has improved burning and physical characteristics. Epoxy plastic compositions are prepared which contain large amounts of inorganic oxidizing material and are capable of forming castings suitable for use as propellant grains. The organic oxidant may be ammonium perchlorate.

Patent 3,184,915 Field 21C, 21F, 22B

ELECTROSTATIC PROPULSION SYSTEM WITH A DIRECT NUCLEAR ELECTRO GENERATOR.
Patent assigned to NASA,
by Charles A. Low, Jr. and William R. Mickelsen.
25 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Electric propulsion, Spacecraft nuclear propulsion), (*Ion engines, Electrostatic generators), (*Spacecraft nuclear propulsion, Electrostatic generators), Space propulsion, Interplanetary trajectories, Rocket propulsion, Nuclear propulsion, Patents.

The propulsion system is for space propulsion. The propulsion system is capable of making very fast interplanetary flights and has an extremely lwo mass-to-power ratio. An electrostatic rocket thruster is matched with a direct-nuclear-electro-generator. The electro-generator consists of a decaying radioisotope.

Patent 3,185,018 Field 21D

METHOD OF FUEL UNIT ASSEMBLY.
Patent assigned to Navy,
by Glenn H. Damon, John Ribovich and Joseph A. Herickes. 25 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Solid jet engine fuels, Fuel systems), Ignition, Binders, Patents.

The solid fuel unit is usable for jet engines, such as the turbo jet, and particularly for the ram jet, as well as for force-feed furnaces, rockets, and similar apparatus. The element is made up of a fuel briquet, a combustible shell and a binding material.

Patent 3,185,036 Field 21H, 16A

FAIL-SAFE DEVICE FOR PORTING STORED ROCKET MOTORS.
Patent assigned to Navy,
by Ernest N. Oeland, Jr. 25 May 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Safety devices, Rocket motors(Solid propellant)), (*Rocket motors(Solid propellant), Safety devices), Storage, Guided missiles, Naval vessels-(Combatant), Naval vessels(Support), Guided missile safety, Patents.

The fail safe device is for use with a missile having an explosive payload at its forward end, a solid propellant rocket motor at its rear end, and an intermediate separable air frame. The missile is stored on and launched from a ship. The missile has an aperture in the rear end of the motor which provides additional exhaust area.

Patent 3,185,096 Field 21H

THRUST REVERSAL UNIT FOR ROCKET MOTOR.
Patent assigned to Navy,
by Roland G. Daudelin. 25 May 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Rocket motors, Thrust reverse), (*Thrust vector control systems, Rocket motors), Guided missiles, Booster motors, Separatation, Patents.

The rocket motor has a plurality of jets spaced around the rocket chamber for providing a reverse thrust. The rocket motor has an axial nozzle. Air pressure entering the nose of the rocket is used to activate an electric circuit to open the thrust reversal nozzles. The operation of the reversal nozzles aids in separating the rocket motor from the forward missile portion.

Patent 3,187,834 Field 21G, 19C

MUFFLER HAVING SPACED FRUSTO-CONICAL BAFFLE PLATES WITH PERFORATED CENTER TUBE AND ATTACHED COOLING FINS.
Patent assigned to Army,
by James R. Bryson and Robert R. Cassilly.
8 Jun 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Engine mufflers, Acoustic impedance), (*Armored vehicles, Engine mufflers), Conical bodies, Pipes, Patents.

The internal combustion engine muffler is employed on armored combat vehicles to suppress the noise of the high powered (800 H. P.) engines. The muffler has a hollow body with an inlet and outlet, spaced baffle plates having aligned openings, a perforated tube extending through the openings and a plurality of cooling fins.

22. Space Technology

N65-16580 Field 22A, 22C
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration,
Langley Station, Va. Langley Research Center.
SIMULATOR STUDY OF ABILITY OF PILOTS TO ESTABLISH NEAR-CIRCULAR LUNAR ORBITS USING SIMPLIFIED GUIDANCE TECHNIQUES,
by G. Kimball Miller, Jr. and Herman S. Fletcher.
Feb 65, 40p NASA-TN-D-2631
Unclassified report

Descriptors: (*Lunar probes, Simulation), (*Space navigation, Lunar probes).

N65-16581 Field 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration,
Langley Station, Va. Langley Research Center.
VISUAL ASPECTS OF A FULL-SIZE PILOT-CONTROLLED SIMULATION OF THE GEMINI-AGENA DOCKING,
by Jack E. Pennington, Howard G. Hatch, Jr.,
Edward R. Long, and Jere B. Cobb. Feb 65, 26p
NASA-TN-D-2632
Unclassified report

Descriptors: (*Spacecraft docking, Simulation), (*Astronautics, Spacecraft docking).

N65-16582 Field 22A, 3B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration,
Langley Station, Va. Langley Research Center.
EXPERIMENTAL INVESTIGATION OF JET IMPINGEMENT ON SURFACES OF FINE PARTICLES IN A VACUUM ENVIRONMENT,
by Norman S. Land and Leonard V. Clark. Feb 65,
33p NASA-TN-D-2633
Unclassified report

Descriptors: (*Lunar probes, Simulation), (*Exhaust flames, Ground effect), Vacuum.

N65-16885 Field 22A, 22B, 22C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration,
Langley Station, Va. Langley Research Center.
INVESTIGATION OF THE DYNAMIC STABILITY AND CONTROLLABILITY OF A TOWED MODEL OF A MODIFIED HALF-CONE REENTRY VEHICLE,
by Robert E. Shanks. Feb 65, 23p
NASA-TN-D-2517
Unclassified report

Descriptors: (*Reentry vehicles, Stability).

N65-17460 Field 22B
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration,
Langley Station, Va. Langley Research Center,
A TENSION SHELL STRUCTURE FOR APPLICATION TO ENTRY VEHICLES,
by Melvin S. Anderson, James C. Robinson,
Harold G. Bush, and Robert W. Fralich. Mar 65, 25p
NASA-TN-D-2675
Unclassified report

Descriptors: (*Reentry vehicles, Design), (*Structural shells, Aerodynamic loading).

N65-18207 Field 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
MODEL INVESTIGATION OF TECHNIQUE FOR CONDUCTING FULL-SCALE LANDING-IMPACT TESTS AT SIMULATED LUNAR GRAVITY,
by Ulysse J. Blanchard. Mar 65, 33p
NASA-TN-D-2586

Unclassified report

Descriptors: (*Landing impact, Lunar craft), (*Lunar environment, Simulation), (*Lunar craft, Landing impact).

N65-18605 Field 22A, 22B
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AN EVALUATION OF GEMINI HAND CONTROLLERS AND INSTRUMENTS FOR DOCKING,
by Byron M. Jaquet and Donald R. Riley. Mar 65, 51p NASA-TM-X-1066

Unclassified report

Descriptors: (*Spacecraft docking, Instrumentation).

N65-18616 Field 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE ORBITING GEOPHYSICAL OBSERVATORIES,
by George H. Ludwig. Mar 65, 45p
NASA-TN-D-2646

Unclassified report

Descriptors: (*Scientific satellites, Orbital trajectories).

N65-18931 Field 22D
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AERODYNAMIC DAMPING AND BUFFET RESPONSE OF AN AEROELASTIC MODEL OF THE SATURN I BLOCK II LAUNCH VEHICLE,
by Perry W. Hanson and Robert V. Doggett, Jr. Mar 65, 53p NASA-TN-D-2713

Unclassified report

Descriptors: (*Launch vehicles(Aerospace), Aerodynamic characteristics).

N65-19285 Field 22B
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
AN ON-OFF CONTROL SYSTEM FOR A ROTATING MANNED SPACECRAFT,
by Peter R. Kurzhals and John G. Shearin. Mar 65, 28p NASA-TN-D-2726

Unclassified report

Descriptors: (*Manned spacecraft, Flight control systems), (*Flight control systems, Manned spacecraft).

N65-20164 Field 22A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
SIMPLIFIED TECHNIQUE FOR ABORTING A LUNAR LANDING MISSION DURING POWERED DESCENT USING MANUAL BACKUP GUIDANCE,
by David B. Middleton. Mar 65, 21p
NASA-TN-D-2724

Unclassified report

Descriptors: (*Lunar probes, Abort), (*Astronautics, Lunar probes).

N65-20401 Field 22B, 22A
CFSTI Prices: HC$6.00 MF$1.50

Honeywell, Inc., Minneapolis, Minn.
STUDY OF AN ATTITUDE CONTROL SYSTEM FOR THE ASTRONAUT MANEUVERING UNIT,
by W. W. Drissel, R. L. Haines, R. J. Kell, D. N. Lovinger, and D. M. Moses. Mar 65, 287p
Contract NASw841
NASA CR-198

Unclassified report

Descriptors: (*Attitude control systems, Astronauts), (*Astronauts, Maneuverability), Propulsion, Maneuverability.

N65-20879 Field 22A, 3A
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
A METEOROID ENVIRONMENT FOR NEAR-EARTH, CISLUNAR, AND NEAR-LUNAR OPERATIONS,
by Paige B. Burbank, Burton G. Cour-Palais, and William E. McAllum. Apr 65, 21p NASA-TN-D-2747

Unclassified report

Descriptors: (*Meteors, Space environmental conditions), (*Space environmental conditions, Meteors).

N65-20995 Field 22D
CFSTI Prices: HC$3.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
TORSIONAL VIBRATION CHARACTERISTICS OF A 1/5-SCALE MODEL OF SATURN SA-1,
by John J. Catherine. Apr 65, 53p
NASA-TN-D-2745

Unclassified report

Descriptors: (*Launch vehicles(Aerospace), Model tests), (*Vibration, Launch vehicles(Aerospace)).

N65-21164 Field 22A
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EXPERIMENTAL INVESTIGATION OF PACKAGING AND DEPLOYMENT CHARACTERISTICS OF AN INFLATABLE TOROIDAL-SPACE-STATION CONFIGURATION,
by Clarence O. Keffer. Apr 65, 45p
NASA-TM-X-1079

Unclassified report

Descriptors: (*Space stations, Inflatable structures), Packaging, Launching.

N65-21642 Field 22D
CFSTI Prices: HC$2.00 MF$0.50

National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
SHADOWGRAPH STUDY OF THE UPPER STAGE FLOW FIELDS OF SOME SATURN V STUDY CONFIGURATIONS IN THE TRANSONIC MACH NUMBER RANGE,
by Dale Andrews and David R. Carlson. Apr 65, 24p NASA-TN-D-2755
Unclassified report

Descriptors: (*Launch vehicles(Aerospace), Transonic characteristics), (*Spark shadowgraph photography, Flow visualization).

N65-22368 Field 22C
CFSTI Prices: HC$1.00 MF$0.50

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
LONGITUDINAL STABILITY CHARACTERISTICS OF SEVERAL PROPOSED PLANETARY ENTRY VEHICLES AT MACH 6.73,
by Peter T. Bernot. Apr 65, 22p Unclassified report
NASA-TN-D-2785
Descriptors: (*Reentry vehicles, Stability), (*Angle of attack, Aerodynamic characteristics).

N65-23163 Field 22C
CFSTI Prices: HC$3.00 MF$0.75

National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
DETERMINATION OF TRAJECTORY AND ANGLES OF ATTACK OF A SCOUT HEAT-TRANSFER SPACECRAFT DURING REENTRY FLIGHT IN THE ATMOSPHERE,
by Robert J. Mayhue. May 65, 76p Unclassified report
NASA-TN-D-2776
Descriptors: (*Atmosphere entry, Aerodynamic heating), (*Aerodynamic heating, Atmosphere entry).

Patent 3,188,139 Field 22A

KNEE RESTRAINT STRAP SYSTEM.
Patent assigned to Air Force, Unclassified patent
by William C. Boyce. 8 Jun 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Astronauts, Safety harness), (*Safety harness, Astronauts),(*Legs, Safety harness), Supports, Patents.

The system is for use by an astronaut on high speed aircraft and space vehicles. The system includes a harness which holds the knee of an astronaut in such a manner that full mobility of the thighs, calves and feet is permitted while the femur is forced into the pelvic socket to prevent submarining. The knee harness is made of a network of straps which criss-cross at the knee to hold the femur back into the pelvic socket.

Patent 3,188,472 Field 22A

METHOD AND APPARATUS FOR DETERMINING SATELLITE ORIENTATION UTILIZING SPATIAL ENERGY SOURCES.
Patent assigned to NASA,
by Elden C. Whipple, Jr. 8 Jun 65 Unclassified report
Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Satellite attitude, Determination), Test equipment, Test method, Patents.

A satellite orientation angle is determined from only two of three types of energy traps. The angle of the vehicle may be ascertained at such times as the earth or a similar object is interposed between the sensor and a luminous body with which it would normally be desired to determine the orientation relative to it. The particle traps are positioned about the satellite's surface.

PB-167 710 Field 22C
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
THEORY OF THE MOTION OF ARTIFICIAL SATELLITES, IV,
by Zdenek Kopal. Jan 59, 29p
Technical summary rept. no. MRC-TSR-70
Contract DA11 022ORD2059
AD 209 840 Unclassified patent
See also PB-167 716.

Descriptors: (*Satellites(Artificial), Celestial mechanics), (*Celestial mechanics, Satellites(Artificial)), Perturbation theory, Orbital trajectories, Mathematical analysis, Motion, Theory, Potential theory, Harmonic analysis, Astronautics.

The aim of the report will be three-fold: (1) To establish the explicit form of asymptotic solutions of Clairaut's equation appropriate for an arbitrary distribution of density in the interior of a fluid configuration exhibiting a weak degree of central condensation (such as the Earth, for instance, or other planets); (2) to establish iterative solutions (and their rate of convergence appropriate for arbitrary configurations whose central condensations are high (such as the stars in general); and (3) to consider the complete solutions of more general equations than (2-29), with an arbitrary (and even discontinuous) function of central distance a on their right-hand side (such as may arise, for instance, if the distorted body does not rotate with a constant angular velocity).

PB-167 716 Field 22C
CFSTI Prices: HC$2.00 MF$0.50

Mathematics Research Center, Univ. of Wisconsin, Madison.
THEORY OF THE MOTION OF ARTIFICIAL SATELLITES, II,
by Zdenek Kopal. Mar 58, 38p
Technical summary rept. MRC-TSR-23
Contract DA11 022ORD2059
AD 161 976
Unclassified report

Descriptors: (*Satellites(Artificial), Celestial mechanics), (*Celestial mechanics, Satellites(Artificial)), Potential theory, Harmonic analysis, Orbital trajectories, Motion, Theory, Astronautics.

A method of formulating the potential (and external form) of a fluid configuration subject to an arbitrary field of force is applied to quantities of second order in the surface harmonics. Such terms arising from the rotational distortion (and, possibly, the cross-terms between rotational distortion and oceanic tides) are apt to influence the motion of an artificial satellite in the immediate neighbourhood of the Earth by amounts which are observationally significant.

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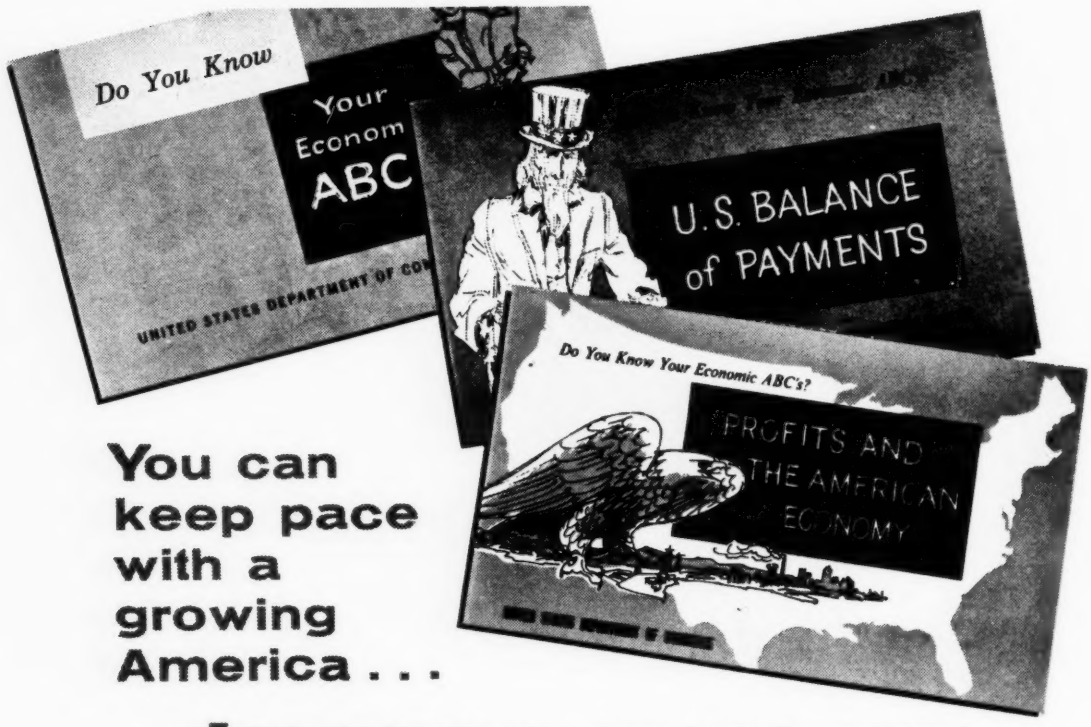

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